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VOL. XI NO. 1

UNITED STATES NAVAL
MEDICAL BULLETIN

PUBLISHED FOR THE

INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
PASSED ASSISTANT SURGEON ROBERT C. RANSDELL, U. S. NAVY
IN CHARGE

JANUARY, 1917
(QUARTERLY)

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WASHINGTON
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

W. C. BRAISTED,
Surgeon General, United States Navy.

U. S. NAVAL MEDICAL BULLETIN.

VOL. XI. JANUARY, 1917. No. 1

SPECIAL ARTICLES.

THE PREVENTION OF VENEREAL DISEASES AT THE NAVAL TRAINING STATION, NORFOLK, VA.

By C. E. RIGGS, Surgeon, United States Navy.

Venereal disease exacts each year a heavy toll from both the health and efficiency of the Army and the Navy. Perhaps an equal or greater toll is exacted in civil life, but, owing to the interdiction which hangs over any degree of publicity in such matters, we are without adequate means of measuring it. The inexorable rule in the Army and Navy that each day of a man's time must be accounted for, and if loss of time be due to ill health it must appear in the statistical returns, has given reliable means to form an estimate of the magnitude of the venereal scourge in the military services. It has also drawn to these services an undeserved and unenviable reputation in regard to venereal disease.

It is desirable to correct this generally unfavorable reputation wherever it is possible to do so. It is also desirable to avoid giving a wrong impression, leading one to believe that there is an unusually large number of venereal infections at this station as compared to the number one would expect to find among the same class of individuals in civil life. The age of the recruits here, from 18 to 26, is the dangerous age for venereal infections in all walks of life. In view of what is to follow, it should be stated in the beginning that a recent analysis of the venereal statistics here has shown that the individual, as a recruit, is less liable to contract a venereal disease under the influence of station environment than he is under the environment of civil life.

The control of venereal diseases is one of the most important of sanitary problems, and it seems to be the general opinion that preventive efforts along these lines have not met with much success. Yet, in no class of diseases is the sanitarian any better supplied with epidemiologic information than he is in the case of venereal diseases. He is familiar with the germs of each of the three diseases; there is no mystery concerning their method of transmission; the remedies for the cure of each are comparatively efficient; and, lastly, there are efficient means of artificial prophylaxis which may be resorted to whenever exposure to infection has taken place. Therefore it is not the sanitarian's armament which is to blame for the remarkable prevalence of these diseases, nor does it seem there is any blame for indifference on the part of the individual. The fault probably lies hidden in the taboo that has always opposed fighting venereal disease in the open.

At the training station and receiving ship at Norfolk there were for the month of January, 1915, 39 admissions to the venereal list. The average complement inclusive of both places for the month was 2,088, and there was therefore a monthly rate of admission of 1.86 per cent, and correspondingly a yearly rate of 22.32 per cent. At this rate of infection the entire command of 2,088 men would have succumbed to some form of veneral disease within a period of time of less than four and one-half years. This seemed a very rapid rate of venereal infection. It strongly condemned the present method of handling the situation, and it urgently called for some change and for greater activity along preventive lines.

The attack upon the venereal situation here was not limited to any particular form of prophylactic treatment. A broad view of the subject was taken, and any form of prophylaxis, such as medical, moral, educational, or punitive, was brought into use if it were thought that it would be of assistance in diminishing venereal disease. Furthermore, representations were made to the municipal authorities of Norfolk, hoping to improve the moral surroundings of the station and thereby lessen opportunities for contracting venereal disease.

A report of municipal research experts made during 1915 states that it was then the policy of the police department of Norfolk to maintain a so-called segregated and regulated red-light district in which were located 80 commercialized houses of prostitution, that the police department did not even enforce its own regulations within this district, and that the sale of liquor and beer in large quantities was permitted. Of course, this district contributed largely to our venereal statistics. During a period of 10 months 41 cases of venereal disease were contracted from a few houses on Avon Street alone, and 416 Washington Street gave the station 7 new cases during the same period of time. To the closing of this district at 12 o'clock Saturday night, June 24, 1916, should be given considerable credit for the subsequent lessening of the number of venereal diseases.

While instituting the venereal prophylactic propaganda here, it was thought that a knowledge of the circumstances surrounding the individual at the time of his exposure and infection might lead to the discovery of further valuable means of prevention. Accordingly, beginning March 1, 1915, each man who contracted a venereal disease was questioned, and a record was made of any fact which it was thought might have exerted some influence in bringing about the infection. That is, was the patient under the influence of alcohol at the time infected, or was the disease contracted prior to enlistment, or while on liberty, or while on furlough? The prostitutes were classified as inmates, streetwalkers, or clandestines, according to the practice of social hygiene workers. It was also noted whether artificial prophylaxis was used and, if so, how many hours subsequent to exposure. If the patient were given to self-analysis, the inquiry was frequently pushed further to ascertain, if possible, just what sinister influence he was inclined to blame for his present misfortune or any past sexual offense.

These statements were taken from all original admissions for venereal disease, beginning March 1, 1915, and ending October 31, 1916. Readmissions were not investigated. There were 365 such statements, and they were conveniently classified under each of the three venereal diseases. If two kinds of venereal disease were present in the same individual, having been contracted by the same exposure, the patient is counted with those of whichever disease is ordinarily considered the more serious. For instance, if the infection is a double one, consisting of both gonorrhea and chancroid, it is classed as gonorrhea; or, if it consists of both gonorrhea and syphilis, it is classed as syphilis. There were four instances of gonorrhea and syphilis having been contracted by the same exposure. No case of syphilis is considered as having had chancroid.

In order to give an idea of the kind of information that was being collected, a summary of syphilis and gonorrhea for the 20 months under consideration is given in the following table:

TABLE No. 1.—*Various circumstances concerning 304 venereal infections.*

Factors in origin.	Syphilis.	Gonorrhea.
Number infected	27	277
Contracted prior to enlistment	3	59
Contracted while on furlough	7	86
Contracted while on liberty	17	132
Under the influence of alcohol	12	105
Not under the influence of alcohol	15	172
Used artificial prophylaxis	8	81
Did not use artificial prophylaxis	19	196
Contracted in Norfolk or vicinity	12	144
Not contracted in vicinity of Norfolk	15	133
Contracted from inmates	12	139
Contracted from streetwalkers	12	100
Contracted from clandestines	3	38

As the work progressed tables were prepared from the accumulated statements at the end of each month and arranged for comparison with the corresponding tables of the previous months. It was hoped that these monthly tables would not only keep us informed of the harm that was being done to the health and efficiency of the command, but that they would also point out definite lines for further prophylactic endeavor. Through them it was expected to note the effect, if any, of any recently installed improvement. Such information arranged monthly for the first 10 months of 1916 is given in the following table:

TABLE No. 2.—*Showing number and kind of diseases contracted during each month.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.
Gonorrhea	20	16	14	20	10	21	10	7	9	6
Chancroid	5	2	6	5	1	5	2	1	1	1
Syphilis	2	4	2	0	2	0	4	1	1	1
Prior to enlistment	8	10	4	0	4	6	3	2	3	3
On liberty	6	7	17	13	5	8	8	6	4	4
On furlough	13	5	1	12	4	12	5	2	4	1
Norfolk or vicinity	10	8	16	13	6	13	6	4	4	5
Not Norfolk or vicinity	17	14	6	12	7	13	10	5	7	3
Used prophylaxis	4	6	10	6	0	4	3	2	3	1
Did not use prophylaxis	23	16	12	19	13	22	13	7	8	7
Alcoholic influence	10	4	12	9	5	8	3	1	2	1
No alcoholic influence	17	18	10	16	8	18	13	8	9	7
Inmates	11	8	7	13	4	14	6	4	2	3
Streetwalkers	14	10	11	8	5	10	4	3	3	3
Clandestines	2	4	4	4	4	2	6	2	6	2
First attack	21	19	18	17	12	14	14	8	9	7
Second attack	5	3	3	8	1	12	2	1	2	1
Third attack	1	0	1	0	0	0	0	0	0	0

Two sets of tables were kept, one for the apprentice seamen under training and one for the men of general detail. Unless otherwise indicated, the tables are combined here.

It is apparent that the statistics which were being collected relate to various aspects of the venereal problem and can not be considered only of interest to the sanitarian. For instance, the question as to the amounts of venereal disease distributed by inmates, streetwalkers, and clandestines, respectively, should be submitted for remedial solution rather to the police or sociologist than the sanitarian. The question as to whether or not the patient had had previous venereal disease was of interest because, naturally, a comparatively large number of first attacks would reflect unfavorably upon station environment. The number of diseases contracted under each of the three circumstances (1) prior to enlistment, (2) at home on furlough, and (3) absent on liberty serves to give enlightenment as to the comparative influence of civil life and station or military life upon the incidence of venereal disease. This happened to be of use upon one occasion to refute some statements made publicly as to the large amount of venereal diseases among the recruits at Norfolk. Of course, the ultimate object of this investigation was to prevent venereal disease, and the three principal factors entering into prevention may be roughly classified as follows:

I.—Artificial prophylaxis.
II.—Alcoholic temperance.
III.—Educational prophylaxis.

I.—ARTIFICIAL PROPHYLAXIS.

The artificial prophylactic treatment administered here is of the so-called Army and Navy type; that is, it consists of calomel ointment of about 33 per cent and of an injection of some silver salt of moderate strength. A prophylactic book is kept in which is recorded the date of the treatment, the man's name, and the number of the hour subsequent to exposure during which the treatment was taken. The matter of making this record an accurate one was not as simple as would seem. It was observed that most men had a tendency to shorten the time since exposure unless reminded to make a careful reckoning, and, if there were two or more exposures, they would almost invariably state the number of hours since the last exposure instead of the number since the first.

Unfortunately a book containing a record of 1,643 prophylactic treatments was lost. There still remains a record of 3,556 treatments, of which 67 turned out to be ineffective. Table No. 3 gives the number of treatments during each hour subsequent to exposure up to and including the tenth hour, after which they are collected into one item as all over 10 hours. There is also given the number of treatments which proved ineffective for the corresponding hour, the percentage of failures, and the last column gives an estimate of the possible number of diseases prevented.

TABLE No. 3.—*Number of prophylactic treatments, number of failures, percentage, and probable number of diseases prevented.*

Hour subsequent to exposure.	Number of treatments.	Number of diseases.	Percentage.	Number of diseases prevented.
1	674	....	....	44.8
2	657	4	0.60	39.7
3	298	2	.67	17.8
4	223	1	.44	13.8
5	156	3	1.91	7.3
6	285	4	1.40	14.9
7	247	5	2.02	11.4
8	359	16	4.46	7.9
9	272	9	3.30	9.1
10	190	10	5.26	2.6
11 and over	195	13	6.66	....
Total	3,556	67	....	169.3

The record of 674 exposures receiving treatment during the first hour without a single following disease indicates that this form of prophylaxis is practically infallible if used within one hour after exposure. The percentage column shows a rather uniform increase in the percentage of failures from the second hour until the eleventh hour is reached. In view of the small size of the numbers from the third hour on upon which the percentages are calculated, there is no marked period at which it can be said the treatments cease to be effective. From other considerations it seems likely that the treatments lose greatly in efficiency somewhere between the fifth and the eighth hours. None of the percentages, however, even the highest one of 6.66 per cent, seems great when it is remembered that practically all prostitutes are diseased.

Considerable interest attaches to the fifth and last column, as it is not often in preventive medicine that we have an opportunity to point out that a certain prophylactic measure has resulted in the prevention of a definite number of diseases. It seems that we can do so in this case with almost mathematical accuracy.

The average rate of infection of venereal disease following illicit sexual intercourse is not known, and it probably varies greatly in different communities. In this instance we will probably err on the conservative side if we assume the percentage to be 6.66 per cent, which is the percentage in the above table of those diseased who took the treatment during the eleventh hour and later. We are, then, assuming that the prophylaxis administered during that period is without preventive value, as otherwise the percentage should be higher and our result proportionately greater. Then, taking 6.66 per cent of the 674 exposures of the first hour gives 44.8 as the probable number of diseases prevented. The same percentage of the 657 exposures for the second hour gives 43.7 from which should be subtracted the four infections of that hour, leaving 39.7 as the probable number of the diseases prevented. The total probable number of diseases prevented is 169.3 and of these just one-half, 84.5, is credited to the treatments of the first and second hours. The calculation may be carried even further and made to show us the probable number each of cases of chancroid, gonorrhea, and syphilis which were prevented.

The total number of venereal infections not receiving prophylactic treatment was 252, and the number and percentages of each disease are as given in the following table:

TABLE No. 4.—*Showing percentage of each disease of total number when prophylaxis was not used.*

Disease.	Number of cases.	Percentage of total.
Chancroid	37	14.7
Gonorrhea	196	77.7
Syphilis	19	7.5

The percentages thus obtained may be considered as expressing the normal proportion of chancroid, gonorrhea, and syphilis for this locality, and may be used to make further calculations. By applying these percentages to the 169.3 prevented diseases we have as follows:

Probable number of cases of chancroid prevented	24.8
Probable number of cases of gonorrhea prevented	131.5
Probable number of cases of syphilis prevented	12.7

When making these calculations it was assumed that the prophylactic treatment has the same relative preventive value for each of the three venereal diseases under all conditions. But such does not seem to be the case, for, if we compare the proportion of the three venereal diseases contracted when prophylaxis was used, with the proportion contracted when prophylaxis was not used, we find that the two proportions are not the same. Of the 365 diseases contracted here, 113 used prophylaxis after exposure, and 252 did not use it. The relative amounts of the three diseases, chancroid, gonorrhea, and syphilis, contracted in each case, are shown in the following table:

TABLE No. 5.—*Showing percentages of each disease with and without prophylaxis.*

	Chancroid.		Gonorrhea.		Syphilis.		Total.
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	
Infections after prophylaxis	24	21.2	81	71.6	8	7.0	113
Infections without prophylaxis	37	14.7	196	77.7	19	7.5	252

That is, when prophylaxis is not used the normal percentage of chancroid of the total number diseased is 14.7, and when prophylaxis is used the percentage is increased to 21.2. This apparent inconsistency may be explained by assuming that the treatment is less effective with the germs of chancroid than with the germs of the other two diseases. In such case the increase is merely in percentage and not in number diseased, for the actual number diseased may even be diminished.

In the report of the Surgeon General of the Navy for 1914 we meet with what seems to be the same condition. In commenting concerning the venereal prophylactic propaganda this report states that the admission rate of chancroid has never been so high as it was in that year. During that year the relative rates of admission for chancroid, gonorrhea, and syphilis were 29.2, 57.3, and 13.3, respectively, while the rates here are 14.7, 77.7, and 7.5, respectively. This high percentage of chancroid is no doubt partly accounted for by the fact that, for the service in general, most syphilitics are entered in the statistical record also as chancroid. It is known that 15 of the 27 cases of syphilis reported here had been previously entered in the statistical returns to the department as chancroid, and it is probable that in this respect no less proportion of duplication obtains throughout the service.

It also seems reasonable, as the prophylactic treatment is in general use in the service, that the increase in percentage of chancroid referred to in the Surgeon General's report is, for a part at least, brought about by those same influences which increased the percentage of this disease here when prophylaxis was used. In other words, the treatment is less efficient against the chancroid germs than it is against the germs of the other two diseases and the increase is, therefore, merely a relative one.

In order to make an estimate of the relative value of the treatment in each of the three diseases, let us assume that 6.66 per cent is the normal percentage of infections without prophylaxis. Applying this percentage to the total number of recorded exposures, which is 5,199, we would expect, had prophylaxis not been employed, to have 346.2 resulting diseases. Assuming that these 346.2 diseases have the normal ratio of 14.7, 77.7, and 7.5 for chancroid, gonorrhea, and syphilis, respectively, we would expect to have found in the total number of cases the following:

Probable number of cases of chancroid	50.9
Probable number of cases of gonorrhea	269.0
Probable number of cases of syphilis	25.9

The numbers in each case of these diseases which actually did occur were 24, 81, and 8, respectively. Then subtracting the number which did occur from the number which would have occurred had prophylaxis not been employed, we find that the prophylactic treatment had prevented the following percentage in each case:

Chancroid	52.8 per cent of probable cases.
Gonorrhea	70.0 per cent of probable cases.
Syphilis	69.0 per cent of probable cases.

These percentages then bear a direct ratio to the preventive value of the treatment for the three different kinds of diseases under all conditions encountered here, including number of hours used subsequent to exposure.

II.—ALCOHOL.

There is an intimate and not well understood relation between alcohol and venereal disease. In the first place, alcohol and prostitution are close allies. Promoters of vice recognizing that alcohol stimulates trade and increases profits have combined the sale of liquor with professional prostitution to practically a universal extent in this country (Kneeland). Among those places catering directly to vice the saloons and their accessories come first, and of all commercial factors promoting vice the saloon stands alone for sinister importance.

Alcohol promotes prostitution, and prostitution is the main source of venereal disease. There are also other well-known connecting influences between alcohol and venereal disease besides the commercial one. Individuals under the influence of alcohol are more liable to expose themselves to venereal infection, as alcohol attacks and paralyzes the higher levels of the nervous system, such as caution, judgment, and self-restraint. Fear of disease, which is an important restraining factor, under the influence of alcohol is likely to be cast to the winds. It is also a therapeutic fact that alcohol should be prohibited from venereal patients, as this drug has a special influence in retarding the progress of the cure.

Metchnikoff has pointed out that alcohol has a harmful action upon the phagocytes, the agents of natural defense against infective microbes, and that persons who indulge too freely in alcohol show far less resistance to infectious diseases than abstemious individuals. Therefore it seems reasonable that the different venereal germs, in particular the attenuated ones, have a greater opportunity to gain a foothold at the time of exposure in those persons whose bodily resistance has been reduced by alcohol than in those persons whose resistance has not been so handicapped. Consequently we would expect to find a greater percentage of infections following exposure under the influence of alcohol than we would find when no alcohol had been imbibed.

Authorities vary considerably in their estimates of the percentage of venereal disease which is contracted when under the influence of alcohol. Among the highest estimates is that of Dr. Douglas White, who states that about 80 per cent of the men who acquired these diseases have told their physicians that they have done so under the influence of some kind of alcohol. Forel gives 76 and Notthafft 30, as the percentage of venereal disease contracted when under the influence of alcohol. Of our 365 venereal patients 137, or 37.5 per cent, admit having been under the influence of alcohol at the time of exposure, and 228, or 62.5 per cent, deny alcohol.

The actual percentage of those having taken alcohol is perhaps a little greater, as it was noted that several, having taken but a glass or two of beer, were unwilling to admit that they were in any way under alcoholic influence. The percentage of each of the three venereal diseases contracted when alcohol was taken and the percentage contracted when it was not taken vary but little, as shown in the following table:

TABLE No. 6.—*Showing disease contracted under the influence of alcohol and not under alcoholic influence.*

	Chancroid.		Gonorrhea.		Syphilis.		Total
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	
Contracted under the influence of alcohol	20	14.5	105	76.6	12	8.7	13
Not contracted under the influence of alcohol	41	17.9	172	75.4	15	6.5	22

This table indicates that the use of alcohol tends to decrease relatively chancroid and to increase relatively gonorrhea and syphilis, as if alcohol had not been used there would be only 103.2 probable cases of gonorrhea and 8.9 probable cases of syphilis instead of actually 105 of the former and 12 of the latter. This unfavorable tendency shown by alcohol directly opposes that exerted by the artificial prophylactic treatments.

Fifty-one cases of chancroid were under treatment for a total of 1,577 days, an average of 30.9 days per man; 221 cases of gonorrhea were under treatment a total of 9,122 days, an average of 41.2 days per man. In the following table these cases are classified as to whether contracted under alcoholic influences or not:

TABLE No. 7.—*Showing numbers and periods of treatment of chancroid and gonorrhea contracted under the influence of alcohol and not so contracted.*

	Chancroid.			Gonorrhea.		
	Number.	Days.	Average.	Number.	Days.	Average.
No history of alcohol	37	1,275	33.9	138	5,887	42.
History of alcohol	14	320	22.8	83	3,235	38.

It is surprising to note that the average number of days required to effect a cure is less, by 11.1 days for chancroid and by 3.7 days for gonorrhea, with those patients who state they were drinking at the time infected than with those who were not drinking. This would appear to indicate something in favor of alcohol, but the indictment against this drug has been long since so completely drawn that we are unwilling now to make any interpretation from the above favorable to it. Therefore the above averages are merely accidental or there is another possible interpretation.

We figured but 6.66 per cent of resulting infections where the exposure to actual infection amounted to not less than 90 per cent of infected prostitutes. Let us assume, then, that the virus of venereal disease is frequently attenuated, and that this accounts for the escape from infection of such a large number of those exposed. Consequently the lowering of the bodily resistance by the use of alcohol would permit an increased number of infections by the attenuated germs which more readily respond to treatment, and therefore the average number of days under treatment of all such cases is less.

III.—EDUCATIONAL PROPHYLAXIS.

Educational prophylaxis is the most important part of the venereal prophylactic propaganda. Also it offers the most hope for the future. This hygienic instruction is usually given by lectures to a body of men, and there can be little doubt that these lectures exert a great influence for good. At this station the lectures are given regularly to the apprentice seamen, which personnel is more constant than that of the general detail. These youths average, perhaps, a little more than 20 years of age, and are for the most part unacquainted with venereal disease. Of the infections which took place among these boys 83 per cent were first attacks. It can not be said, however, that they had the same ignorance of sexual incontinence.

The circular letter of the Secretary of the Navy of February 27, 1915, makes instruction in so-called educational prophylaxis mandatory, and states that such instructions shall be given so that no man shall be subject to loss of health through ignorance of the serious results that may come to those contaminated. The question as to what constitutes suitable material to present to boys in a hygienic lecture is still an open one, although of late it has received considerable discussion. Of course we wish to avoid giving any information which would excite unfavorable curiosity, or minimize the serious nature of venereal disease, or give a specious sense of security; the last being a frequent cause for criticism of instruction in the methods of artificial prophylaxis.

In the Navy the kind and amount of instruction to be given are left to the individual medical officers, and therefore it probably varies greatly throughout the service. A brief outline of the lecture given here is as follows: There is first stated the high authority for giving the instruction, which of course is the circular letter mentioned. Also certain parts of the letter are read to the class, in particular those parts which relate the remarkable prevalence of venereal disease both in and out of the service. The three venereal diseases are then briefly described and emphasis laid upon the fact that these diseases are caused by germs and each by a different germ; that these germs obey the same laws of nature as the germs of other diseases, and that they will grow wherever they find a suitable soil. The statement that practically all prostitutes are diseased seems to make the greatest impression. To drive this home, the following paragraph from "Commercialized Prostitution in New York City" is read to the class: "Of the 466 girls tested only 50, that is 10.7 per cent, are found to be free from venereal infection. Practically 90 per cent showed infection; 107, or 36.4 per cent, gave positive reactions for both syphilis and gonorrhea; 27, or 5.79 per cent, were positive for syphilis only, and 117, or 25.1 per cent, were positive for gonorrhea only." It is also explained that these statistics apply to young girls, and that with older prostitutes 100 per cent should be expected. It is taught that sexual continence is compatible with perfect health and that alcohol and venereal disease are close allies. Finally, after repeated admonitions to avoid the dangers of illicit sexual intercourse, the subject of artificial prophylaxis is introduced. It is stated that this method is not a guarantee against infection and that it should be resorted to as soon as possible after exposure; that allowing time to elapse after exposure gives the greater opportunity for the germs of disease to intrench themselves against antiseptic attack.

The lectures in educational prophylaxis were inaugurated during March, 1915. In lectures elsewhere, the subject of artificial prophylaxis is frequently omitted, as it is considered that as soon as instruction in this method of prevention is given there arises the danger of its being regarded as a tacit encouragement to incontinence, thus rendering nugatory a large part of the educational value of the lecture.[1] When instruction in artificial prophylaxis is given alone, it might be regarded by the class as an encouragement to incontinence, but if combined with educational prophylaxis it should not have any such result. If a knowledge of the preventive power of medical prophylaxis does promote sexual incontinence by the sense of security thereby engendered, we would expect to find an increase in the number of prophylactic treatments administered coincident with the inauguration of the lectures. But instead of an augmentation in number of treatments there is actually a falling off of treatments beginning at the same time as the lectures, and for the subsequent 20 months the percentage of treatments does not return to anywhere near what it was prior to the lectures. The following table gives a record of the treatments from October 1, 1914, till October 31, 1916:

TABLE No. 8.—*Numbers and percentages of those taking prophylaxis for a period of 5 months prior to lectures and for 4 succeeding periods of 5 months each (apprentice seamen branch).*

	Average complement.	Number taking prophylaxis.	Percentage.
First 5 months	794	1,006	126.7
Second 5 months	783	515	65.7
Third 5 months	618	309	50.0
Fourth 5 months	798	531	66.5
Fifth 5 months	468	458	97.8

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[1] Prevention of Venereal Diseases in the Army. Otto May. Practitioner, London, May, 1916.

For the fifth group the number of treatments for each month was June, 223; July, 97; August, 42; September, 55; and October, 41. To explain the exceedingly large number for June, it should be remembered that it had been pretty well advertised that the red-light district of Norfolk was to close the last of June, and evidently many were enticed there to see what they believed they would never have another opportunity to see. If we substitute for the 223 treatments of June the average number for the remaining four months of that period the percentage for the fifth five months falls from 97.8 to 62.6. Therefore it would seem that hygienic instruction, combined with instruction in artificial prophylaxis, has a tendency to reduce the amount of illicit sexual intercourse, and there is little, if any, neutralizing of the good effect of the former by any ill effect of the latter.

One effect of these lectures was to render the artificial prophylaxis more efficient by diminishing the period of time of taking it subsequent to exposure. The following table shows to what extent this was brought about during the first 10 months of 1916:

TABLE No. 9.—*Prophylactic treatments for 10 months according to the hour taken subsequent to exposure.*

	Number of hours after exposure.											
	1	2	3	4	5	6	7	8	9	10	Over 10.	Total.
January	9	27	26	8	8	23	22	32	27	16	21	219
February	39	80	28	15	13	15	7	16	20	15	17	265
March	74	49	27	15	16	36	19	32	35	14	10	327
April	52	34	15	6	9	13	17	24	30	26	12	238
May	6	5	9	6	11	14	18	23	33	11	20	156
June	133	123	33	23	2	11	11	14	16	6	10	382
July	59	93	38	27	11	3	1	4	2	1	1	240
August	86	79	36	16	8	4	4	2	4	7	2	248
September	133	66	28	13	12	6	2	3	0	3	4	270
October	68	71	21	12	5	4	7	6	5	7	4	210
Total	659	627	261	141	95	129	108	156	172	106	101	2,555
Number of diseases	0	3	2	1	3	3	2	6	5	8	4	37
Percentage	0	0.47	0.76	0.70	3.15	2.32	1.85	3.84	2.90	7.54	3.96	1.44

After the second hour the number of the exposures for each hour is so small that the percentages are uncertain.

In the end the value of any prophylactic propaganda is to be measured by the result obtained in reducing the incidence of the disease to which it is applied. In measuring our results here it would be manifestly unfair to include, in calculating the percentages, those who contracted their diseases prior to enlistment, as they were clearly beyond the reach of any preventive work done here.

Probably the fairest way to form an estimate of the result of our work would be to take into consideration only those cases which were contracted while absent from the station on liberty. Of the 304 cases of gonorrhea and syphilis 156, or 51.3 per cent, were contracted in Norfolk or vicinity and for the most part while on liberty. It seems reasonable that the station should assume the responsibility for these 156 infections. If the 20 months during which these 156 diseases were contracted are divided into periods of 4 months each, we have as follows:

TABLE No. 10.—*Percentages of diseases contracted in periods of 4 months each for the 20 months from Mar. 1, 1915, till Oct. 31, 1916.*

	Average complement.	Number diseased.	Percentage.	Yearly rate.
First 4 months	1,660	50	3.01	9.03
Second 4 months	1,294	31	2.39	7.17
Third 4 months	1,510	30	1.98	5.94
Fourth 4 months	1,940	30	1.54	4.62
Fifth 4 months	1,206	15	1.24	3.72

Two hundred and forty-two cases of gonorrhea and syphilis were contracted while on liberty or on furlough. Separating these, as in the previous table, we have as follows:

TABLE No. 11.—*Gonorrhea and syphilis contracted while on liberty and while on furlough.*

	Average complement.	Number diseased.	Percentage.	Yearly rate.
First 4 months	1,660	62	3.73	11.19
Second 4 months	1,294	49	3.78	11.34
Third 4 months	1,510	48	3.17	9.51
Fourth 4 months	1,940	55	2.83	8.49
Fifth 4 months	1,206	28	2.32	6.96

Accordingly, it appears that the best result is obtained while the recruit is receiving instruction at the station, and that he is less mindful of the hygienic instruction given here when he is absent from the station on furlough. He is very likely still less mindful when in active service aboard ship, unless what he has already learned here is supported by further instruction there.

Three cases of syphilis and 59 of gonorrhea were contracted prior to enlistment, and represent 13.3 per cent of the former and 21.3 per cent of the latter. There were but 4 double infections, amounting only to 1.34 per cent.

The small percentage of double infections is surprising when it is considered that a majority of prostitutes have both diseases. At the Bedford institution 36.4 per cent gave positive reactions for both syphilis and gonorrhea, and the percentage among older prostitutes must be higher. Even supposing that the proportion of exposures to syphilis and gonorrhea met with here is as 1 is to 2, we then find the resulting diseases are as 27 is to 277, or about as 1 is to 10. Therefore, it seems that for these two diseases, as encountered in prostitutes, the germs of gonorrhea are considerably more infectious than those of syphilis.

The last table gives the source of infection and the number and percentage of each disease contracted from the corresponding source.

TABLE No. 12.—*Concerning source from which diseases are contracted and number and percentage of each kind of disease.*

	Number of diseases.	Chancroid.		Gonorrhea.		Syphilis.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Inmates	184	33	17.9	139	75.5	12	6.5
Streetwalkers	138	24	17.3	102	73.9	12	9.4
Clandestines	43	4	9.3	36	83.7	3	6.9

CONCLUSIONS.

1. The problem for the prevention of venereal disease is a many-sided one and education is the most important factor.

2. Educational prophylaxis should combine instruction from several points of view, and it should be supplemented by artificial prophylaxis, which, under such circumstances, does not tend to render nugatory the value of hygienic instruction.

3. Artificial prophylaxis, to be effective, should be administered during the first or second hour after exposure; during the first hour it is practically infallible.

4. The propagandas for the prevention of venereal disease and for alcoholic temperance may well go hand in hand, because (*a*) an attack upon one attacks the other and (*b*) for convenience, as the two evils principally exist among those of about the same social status.

5. Only 1 patient of the 365 claims to have contracted his disease (syphilis) innocently.

6. In the service hygenic instruction should be repeated at suitable intervals of time, as otherwise the good impression made by these lectures will be largely forgotten.

7. Almost any form of venereal prophylaxis should accomplish some good, but it is to be expected that the best result will be obtained from a many-sided attack energetically pushed.

THE COMPLEMENT-FIXATION REACTION ON BOARD SHIP.

By W. W. CRESS, Assistant Surgeon, United States Navy.

The complement-fixation reaction for the diagnosis of syphilis is undoubtedly the most valuable test we possess for ascertaining the presence of that disease in all its stages. It is practically always impossible to find and identify the *Treponema pallidum* after the first few weeks of the disease. Following the diagnosis one is hardly justified in assuming responsibility for the treatment in the absence of facilities for the frequent examination of the patient's blood serum.

During the past year the writer has been working with various complement-fixation tests, including the Noguchi, Emery, and the method recently described by Butler and Landon.[1] The Noguchi technic was discontinued as being impracticable on account of the difficulty of obtaining guinea-pigs. The Emery was found to be fairly reliable in checking up on the results of treatment, but rather undependable as a means of diagnosis. Butler's technic, in which human serum is used as complement, was controlled with other methods, and in no case did it fail to give the same reaction as the Noguchi. However, it is believed that the test described by Dr. Butler, in the hands of a tyro, is open to errors. The writer has found it rather difficult to standardize the pipettes to deliver the specified volume of the reagent.

Again, it would seem that very little time is saved by sensitizing the red cells at the same time that the absorption is going on, and that this part of the technic is conducive to error.

Recently, the writer has been doing a complement-fixation test in which are used human serum for complement and antihuman amboceptor, preserved by adding a solution of phenol in salt solution and keeping in small ampules. This test has been thoroughly controlled and checked by submitting specimens of the same sera to a laboratory,[2] where a modification of both the original Wassermann and Noguchi is done. The results have checked in every case. Forty-six specimens have been submitted up to the present time.

Equipment.—Most of the equipment was made on board ship.

Centrifuge.—An electric centrifuge was improvised by attaching the arm of an old hand centrifuge to an old discarded electric fan.

Incubator.—By submitting plans to the ship's coppersmith and electrician an incubator can be made which equals, if not excels, many of the incubators put out by the laboratory supply houses.

Sterilizer.—A small electric sterilizer[3] is not essential, but it is of value in sterilizing glassware, and by attaching an inexpensive rheostat the required degree of heat may be obtained and the same apparatus used as a water bath for inactivating all sera.

Frame for holding test tubes.—The frames in use on this vessel were made by the coppersmith and hold 40 tubes.

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[1] Butler, C. S., and Landon, W. F. A Technic for the Absorption Test for Syphilis Using Human Complement. NAVAL MEDICAL BULLETIN, x, No. 1, January, 1916.

[2] Laboratory, department hospital, Fort Shafter, Honolulu, Hawaii.

[3] Such a sterilizer was described by Surgeon A. Farenholt, NAVAL MEDICAL BULLETIN, x, No. 1, January, 1916.

Glass pipettes.—Soft one-half-inch glass tubing is heated over a blow torch and drawn out to a fine point and rubber bulbs from medicine droppers are attached. Each pipette is marked and one pipette is always used to deliver the same reagent. One pipette may be used to deliver all specimens of serum to be examined, provided the pipette is thoroughly cleansed with salt solution after delivering each specimen.

The following reagents are required:

1. Complement.—Human blood serum from a known nonsyphilitic person.
2. Amboceptor.—Serum of rabbits immunized to human red cells.
3. Antigen.—Acetone insoluble.
4. Human red cells.—Ten per cent suspension in normal salt solution.
5. Serum to be tested.—Inactivated.
6. Normal salt solution.

Complement.—About 5 mils of blood are obtained from a person known to be free from syphilis, set aside and the serum allowed to separate. This is done at the same time that the specimens of sera are obtained for that day's tests. If serum is blood stained, it should be centrifuged. It is necessary to titrate the complement before beginning each series of tests. The serum is diluted with an equal amount of normal salt solution and titrated as follows:

Tube No.	Amount of salt solution.	Amount of blood suspension (10 per cent).	Amount of amboceptor.	Amount of complement.	
	Mil.	*Drops.*	*Unit.*	*Drops.*	
1	0.9	2	1	1	Incubate in water bath or incubator at 37 C. for 1 hour.
2	.9	2	1	2	
3	.9	2	1	3	
4	.9	2	1	4	
5	.9	2	1	5	
6	.9	2	1	6	
7	.9	2	1	None.	

The smallest amount of serum dilution causing complete hemolysis after incubating at 37 C. in incubator or water bath for one hour equals one unit. Two units are used in the test.[1]

Amboceptor.—The hemolytic serum (amboceptor) is obtained from rabbits immunized to human red cells. There are numerous methods of producing hemolytic sera of high titer. The following method is recommended: A rabbit is injected intraperitoneally with a 50 per cent suspension of human red cells in normal salt solution. The first dose should be not less than 4 mils red cells in an equal amount of salt solution. The dose is increased two mils at each injection until six injections have been given. These injections are given at intervals of from five to eight days. Seven days after the last injection a few drops of blood are withdrawn from the marginal vein of the rabbit's ear, by means of a capillary tube, the serum allowed to separate, and then inactivated by heating in a water bath at 56 C. for one-half hour. A 1 to 40 dilution in salt solution is then made and its titer determined as follows:

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[1] The idea for this simplified method of demonstrating the test was obtained from Studies of Syphilis, by Captains Charles F. Craig and Henry J. Nichols, Medical Corps, U. S. Army, Bulletin No. 3, War Department, Office of the Surgeon General.

Tube No.	Amount salt solution.	Units of complement.	Amount of blood suspension (10 per cent).	Amount of amboceptor (1–40).	
	Mil.	*Units.*	*Drops.*	*Drops.*	
1	0.9	1	2	1	Incubate in water bath or incubator at 37 C. for 1 hour.
2	.9	1	2	2	
3	.9	1	2	3	
4	.9	1	2	4	
5	.9	1	2	5	
6	.9	1	2	None.	

All tubes with the exception of No. 6 should show hemolysis, provided the serum is of sufficient strength. If tubes No. 1 and 2 show hemolysis, the rabbit's serum is of sufficient strength and the rabbit should be bled, the serum collected, and inactivated. It is then diluted with an equal volume of a 1 per cent phenol in normal salt solution, sealed in small glass ampules, and kept in the ice box. One mil antityphoid vaccine ampules make excellent containers for amboceptor serum. Amboceptor kept in this way has given better results than when taken up on filter paper.[1] The serum-impregnated paper apparently does not retain its strength in all climates.

Preparation and titration of antigen.—The writer has used both the cholesterinized alcoholic extract of normal tissues and the acetone-insoluble antigen, and has discarded the former in favor of the latter.

Acetone insoluble is prepared as follows: A fresh beef heart is obtained from the abattoir, cut in small pieces, and all particles of fat and connective tissue are removed. The muscular portions are passed through a meat grinder and 50 grams are placed in a wide-necked bottle containing 500 mils of 95 per cent ethyl alcohol.

The bottle is placed in an incubator or water bath and incubated at 37 C. for at least five days. During this time the bottle is thoroughly shaken four or five times every 24 hours. After filtering through rather coarse filter paper the filtrate is collected, placed in a large Petri dish (a soup plate answers the purpose), placed under an electric fan, and allowed to evaporate until nothing remains but a thick tenacious substance. About 50 mils of chemically pure ether are added to this substance, and the whole placed in a stoppered bottle in the ice box. After 24 hours the clear supernatant liquid is removed and allowed to evaporate to one-third of its original volume. To this substance are added about 100 mils chemically pure acetone. After allowing this mixture to stand until the insoluble portion has collected at the bottom the supernatant portion is removed and the precipitate allowed to evaporate until a sticky mass remains. To each 0.3 gram of this is added 1 mil of ether and 9 mils chemically pure methyl alcohol. This is known as the stock antigen. To prepare the solution for the actual test and for titrating all reagents, 1 mil of the stock antigen is added to 9 mils of normal salt solution. The stock antigen solution may be kept at room temperature. Before the antigen is used in the actual test it must be subjected to the following tests:

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[1] For technic of preparation of this paper the reader is referred to the following: Noguchi, H., Serum Diagnosis of Syphilis. Stitt, E. R., Practical Bacteriology and Blood Work. Craig, C. F., and Nichols, H. J., *loc. cit.*

1. It must be titrated with a syphilitic serum in order to ascertain whether or not it possesses antigenic properties.

Tube No.	Amount of salt solution.	Syphilitic serum (inactivated).	Amount of complement.	Amount antigen emulsion.		Blood suspension (10 per cent).	Amboceptor.	
	Mil.	*Drops.*	*Units.*	*Drops.*		*Drops.*	*Units.*	
1	0.9	4	2	1	Incubate at 37 C. for ½ hour.	2	2	Incubate at 37 C. for 1 hour.
2	.9	4	2	2		2	2	
3	.9	4	2	3		2	2	
4	.9	4	2	4		2	2	
5	.9	4	2	None.		2	2	

Tubes 1 to 4 should show inhibition of hemolysis. Tube No. 5, containing no antigen, should show hemolysis.

2. It must be titrated with a negative serum to prove that it will not prevent hemolysis in the absence of a syphilitic serum.

Tube No.	Amount of salt solution.	Amount normal serum.	Amount of complement.	Amount antigen emulsion.		Blood suspension (10 per cent).	Amboceptor (1–40).	
	Mil.	*Drops.*	*Units.*	*Drops.*		*Drops.*	*Units.*	
1	0.9	4	2	1	Incubator or water bath at 37 C. 1 hour.	2	2	Incubator or water bath 37 C. for 1 hour.
2	.9	4	2	2		2	2	
3	.9	4	2	3		2	2	
4	.9	4	2	4		2	2	
5	.9	4	2	None.		2	2	

3. The antigen must be titrated in the absence of amboceptor and normal and syphilitic sera to determine the absence of hemolytic properties.

Tube No.	Amount of salt solution.	Units of complement.	Amount of antigen.	Amount of blood suspension (10 per cent).	
	Mil.	*Units.*	*Drops.*	*Drops.*	
1	0.9	2	1	2	Incubator or wate bath at 37 C. for hour.
2	.9	2	2	2	
3	.9	2	3	2	
4	.9	2	4	2	
5	.9	2	None.	2	

4. If the antigen does not contain hemolytic substances, none of the tubes should show hemolysis. If one or more of the tubes containing antigen show hemolysis, the antigen should not be used.

5. The antigen must be titrated to ascertain the absence of anticomplementary substances.

Tube No.	Amount of salt solution.	Amount of complement.	Amount of antigen emulsion.	Amount of blood suspension (10 per cent).	Amount of amboceptor.	
	Mil.	*Units.*	*Drops.*	*Drops.*	*Units.*	
1	0.9	2	1	2	2	Incubate at 37 C. for 1 hour.
2	.9	2	2	2	2	
3	.9	2	3	2	2	
4	.9	2	4	2	2	
5	.9	2	None.	2	2	

All tubes should show complete hemolysis. If the tube containing no antigen shows inhibition of hemolysis, the fault may be charged to the cell suspension, amboceptor, or the complement.

The blood suspension is prepared as follows: A few drops of blood are collected in a centrifuge tube containing 1 per cent sodium citrate in normal salt solution. The cells are thrown down and all serum removed by three or four washings in normal salt solution. The upper layer of white cells should be removed by means of a capillary pipette. After all serum has been removed a 10 per cent suspension of red cells in normal salt solution is made up.

The patient's blood serum.—The patient's blood is obtained on the morning of the test. An area over the anterior aspect of the forearm at the bend of the elbow is painted with tincture of iodin and a rubber bandage applied above this area. A needle of rather large caliber is thrust into the most prominent vein and about 6 mils of blood allowed to flow into a large test tube (potato tube), and set aside at a slant. Within one-half hour sufficient serum will have collected and this is removed, placed in a small ampule, and inactivated at 56 C. for one-half hour. After the tests have been made these ampules are marked negative or positive, sealed, placed in the ice box, and the serum contained therein used as controls for the next series of tests. Serum, when inactivated, placed in sterile ampules in the ice box will keep for some time.

The test is performed as follows: Two rows of small test tubes (75 mm. by 11 mm.) are placed in small copper frame. Two tubes are required for each specimen of serum and two tubes for each control of normal and syphilitic serum.

Tube No.	Salt solution.	Serum inactivated.	Complement.	Antigen emulsion.		Blood suspension (10 per cent).	Amboceptor.	
	Mil.	*Drops.*	*Units.*	*Units.*		*Drops.*	*Units.*	
1 Ant.	0.9	4 syphilitic serum	2	1	Incubator or water bath at 37 C. for ½ hour. Then add—	2	2	Incubator or water bath at 37 C. for 1 hour.
1 Post.	.9	do	2	None		2	2	
2 Ant.	.9	4 negative serum	2	1		2	2	
2 Post.	.9	do	2	None		2	2	
3 Ant.	.9	4 serum to be tested	2	1		2	2	
3 Post.	.9	do	2	None		2	2	

After incubating for one hour the rack containing the tubes is set aside in a cool place or in the ice box for one hour and then read. The posterior tubes containing no antigen should show hemolysis. Tube No. 1, anterior, containing a known syphilitic serum, should show inhibition of hemolysis as evidenced by a collection of cells at the bottom of the tube. Tube No. 2, containing a known negative serum, should show hemolysis. Tube No. 3 (anterior) should show hemolysis or inhibition of hemolysis, according to whether it is negative or positive.

THE SYPHILIS RECORD.

By G. F. Cottle, Passed Assistant Surgeon, United States Navy.

Syphilis is well treated by the naval medical officer, but the record made by him of treatment given is not always completely set down in the patient's health record. Upon reenlistment the record of treatment disappears and only the one word "syphilis" remains in the abstract. The health record which accompanies each man throughout his service career is an excellently planned document. The medicolegal evidence it contains is in a very well-arranged form. It also gives space to a brief description of the man's illness. Most medical or surgical conditions to which the enlisted man is subject begin and end in the care of one or two medical officers. Seldom does onset to final disposition extend over a long period. Seldom does the description in detail of the medical or surgical care of these illnesses have more than a temporary interest. The record as a medical document is therefore purposely brief and sketchy, its medical content is reduced to make way for the medicolegal. With syphilis we have a different situation. Here onset to final disposition extends through a series of years. Diagnosed by one medical officer, treated by another the case must often be reviewed by many other medical officers. To the medical officers who thus become successively responsible for the treatment and care of a case of syphilis a record of the salient facts of the diagnosis and treatment already given becomes of great importance.

If the medical officers of the Navy could be led to follow a uniform plan for the diagnosis of syphilis and to follow a uniform method in its treatment and care, it would probably work to the advantage of the patient and would make it easy to keep a complete and easily read record of any case. There, however, is little likelihood that uniformity can be obtained while so wide a divergence of opinion in these matters exists in the medical profession. As to the principles that underlie the diagnosis and treatment of syphilis there seems to be practical agreement. It is in the details that differences appear. A study of health records will show great diversity in the recording of this disease. There are medical officers who seem to feel that in a positive Wassermann we have definite evidence of a syphilitic infection, for some records will contain this one bit of evidence and no more. There are medical officers who say they place no reliance on a Wassermann at all. There are medical officers who believe a diagnosis can be made by finding the treponema in the lesion, some of these consider the india-ink or a staining method reliable, others consider it impossible to say the treponema has been identified unless revealed by the method of dark-field illumination. There are medical officers who say a diagnosis is not certain unless there are sufficient clinical features in the case to make the case clinically positive, others never feel sure unless the clinical is backed by some laboratory finding. There are medical officers who believe no diagnosis is completely made in this disease until the therapeutic test has been applied. As with the diagnosis so with the details of treatment. Many believe mercury should precede arsenic, some believe this is unnecessary, some believe enough in the efficacy of the arsenic preparations to expect an early cure when active early treatment has been instituted, others say the arsenic preparations are good temporarily but have no permanent effect, most place great confidence in mercury but differ as to whether pills, inunctions, or hypodermics are best; they even differ as to whether soluble or insoluble salts should be used by hypodermic, and lately we have those who feel that the intravenous administration of mercury is far superior to any other means.

The differences of opinion are of course more apparent than real. In a disease whose onset is so insidious, whose course is so long, many factors enter to cause each case at any one period to be to a large degree a law unto itself. The points upon which a diagnosis can irrefutably rest are different at different stages in the disease. The way in which medication is given and the kind of medication used varies with the stage of the disease, with the patient's idiosyncrasies, and the medical officer's predilections for certain methods. No matter how desirable uniformity of diagnosis and treatment may be it seems impossible to expect it. Fortunately there is agreement upon the essential underlying principles of diagnosis and treatment. No one can deny that both the patient and every medical officer who must take care of him have a right to know upon what facts so important a diagnosis was originally based; practically all are agreed that the arsenic preparations have a brilliant clinical effect, that mercury should be used in some form for a considerable period, and that potassium iodid is of great value in the later stage of the disease; practically all are agreed that treatment must be persisted in for a considerable period of time and that prolonged observation aided by the serum tests will prove of real value by lessening the chance that a latent form of the disease without outward subjective or objective manifestations may go undiscovered. So seldom does a given patient with syphilis have the advantage of remaining in the care of one medical officer from the moment of diagnosis to the time of cure and so great is the diversity of opinion as to the details of treatment that it seems proper to emphasize the importance of a concise and complete record of what has been done. While it may be impossible to standardize one method of diagnosis and treatment in detail it is not impossible to standardize a method of recording the data upon which the diagnosis was made and of recording the exact treatment given.

That the proper care of this disease is a large contract in the Navy is evident when we consider that 2¼ per cent of our personnel become syphilized each year. (See table taken from Report of Surgeon General, 1915.)

Year.	Average complement.	Admissions.	Rate.
1910	58,340	1,315	22.54
1911	61,399	1,665	27.11
1912	61,897	1,424	23.00
1913	65,926	1,447	21.94
1914	67,141	1,332	19.83

At all times there are in the service a large number of men who have acquired syphilis in the past. A review of the medical records of a ship or a station will show a very considerable per cent with the word "syphilis" on some page. An examination of 413 health records on this ship (*North Carolina*) to-day shows 10 entries of "syphilis" diagnosed by the medical officer during the past 2½ years and 19 entries of "syphilis" diagnosed by other medical officers. During three years at sea the writer has placed the diagnosis "syphilis" on 26 health records and has had charge of 50 health records upon which the diagnosis was made by other medical officers. If anywhere near this proportion of entries of syphilis is present on the health records throughout the service, the fact that the entry "syphilis" on naval health records is frequent must be admitted.

Whenever a medical record is received with the entry "syphilis" on it, certain facts must be known before an intelligent conclusion can be reached as to whether or not the case needs further treatment or only observation. The data upon which the diagnosis was based, the treatment that has been administered, the Wassermann tests that have been made before, during, and after treatment should be readily available. How many medical officers place these facts on the record in a clear-cut, complete, and readily available fashion? What medical officer can intelligently treat or observe a case without the essential facts set down in an authoritative and definite form? How often is it necessary to ask the man, "What treatment did you receive? What were the results of the Wassermann tests you have had?" How frequently is there found a man who honestly thinks he never had syphilis, who was not sufficiently convinced that he had syphilis by the medical officer who made the diagnosis, and is therefore not desirous of being further treated or even observed?

Of course it may be said "Why worry?" These men upon whose health records appear the entry "syphilis" are not sick; they have no open lesions; other medical officers have observed them months, perhaps years; a long time has gone by since they had any outward manifestations of the disease; they are not anxious to be observed; often they are resistant to even the simple procedure of a needle prick for a Wassermann test. "Why worry?" They have had a disease not in the line of duty, they are strong and at work. Why not let them alone? Why delve into their past history and try to extract from them the story of their disease? Why expect a medical officer to tell in detail what he has done when he has forwarded the man to you with the statement on the abstract "physically fit for the service," and has backed this statement with his signature?

During the past six years the writer has seen three cases that have emphasized in his mind the importance of knowing all that can be known about every man upon whose record appears the word "syphilis." A young man was at work performing the duties of his rate. He went out one afternoon on liberty. He was brought back unconscious. He lay sick for several weeks. When he finally got up he was paralyzed on one side, face, arm, and leg and his mental capacity was so reduced that for the rest of his life he could be nothing but a terrible burden on those responsible for his care. Another man at work performing the duties of his rate had a headache, felt dizzy, became unconscious, and lay sick for awhile. When he got up he could not talk, and his mental capacity was reduced very materially. Another was unlashing his hammock preparatory to turning in when he fell to the deck gasping for breath. From this he recovered after reaching the sick bay. An hour later he had another attack of respiratory difficulty and died in a few moments. Necropsy showed aortitis, vegetations on the aortic valves, and infarct of the kidney. These three men had had syphilis. They had been treated for the disease and all were apparently in perfect health up to the moment they were stricken. The first had a cerebral hemorrhage that made him hemiplegic; the second had a cerebral lesion that made him aphasic; the third had an embolus that killed him. All were undoubtedly due to an antecedent syphilitic infection. Had these men been properly treated? Were the facts of treatment placed clearly and distinctly on their records? Did the medical officers who cared for them just before they were stricken know whether they were Wassermann negative or Wassermann positive? Had they been continuously and intelligently under medical observation with all essential facts recorded from the moment of diagnosis to the moment when the dread disease syphilis so suddenly produced its terrible effect? Had each medical officer placed on these records the facts needed by subsequent medical officers? Was the medical officer who was responsible for the medical supervision of these men just prior to the moment they were stricken in full possession of the facts? Had he been given a fair show for intelligent observation by those who had previously had the men in their charge?

We have learned the importance of the teeth in medical conditions and have added a special page to the health record, a recognition in this record of the importance of intelligent and recorded supervision of the teeth. Yet how few are the diseases in the annual report of the Surgeon General directly attributable to the teeth. Shall we properly recognize the medical profession's new knowledge of the hygienic importance of the teeth and then fail to fully recognize the medical profession's new knowledge of the far-reaching importance of the disease, syphilis? Have we yet a cure so certain that we can afford to reenlist a man and have his new health record show just the one word "syphilis" in the abstract of former enlistment and rest secure that because he has been reenlisted that word need not be thought of until some day the man comes for treatment or is brought to us for treatment?

Real difficulties beset the path of the medical officer who attempts intelligently to observe and advise his patients who have the entry "syphilis" on their health records. It is believed these difficultie would be greatly lessened by adding to the health record a speci abstract for every man who has "syphilis" entered on his recor this special abstract to accompany him from ship to ship and fro enlistment to enlistment. Such an abstract should fulfill certai essential conditions:

(1) It should contain a signed statement of the facts upon whic the medical officer making the diagnosis based such diagnosis.

(2) It should show on its face that the patient has been mad fully cognizant of the new responsibilities and duties that immedi ately devolve upon him the moment such a diagnosis has been mad

(3) It should show completely yet briefly the exact treatment tha has been administered.

(4) It should show what observations have been made to indicat the progress of the case toward a cure, i. e., Wassermann tests, etc.

Two years ago three suggestions for recording the treatment an care of these cases were made in the BULLETIN.[1] These suggestion were alike in emphasizing the importance of improving our metho of recording syphilis. They differed in the detail proposed. It i believed that uniformity in recording our cases of syphilis is muc to be desired and of sufficient importance to warrant a further sug gestion along this line. The form appended endeavors to combin the essential features of the three suggestions and to adapt them t our present health records.

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[1] NAVAL MEDICAL BULLETIN, x, No. 4, October, 1914.

INSTRUCTIONS.

This record will follow the same course as the abstract of Health Record and will be inserted when opened in the Health Record just after the abstract.

This record is additional to and in no way replaces the Medical Record. The entries of "line of duty" and "sick days" will be recorded as for other diseases.

SYPHILIS ABSTRACT.

Name of Patient--

Date.	DIAGNOSIS.	Description.
	Exposure. Primary. Treponemata. Secondaries. Tertiaries. Wassermann. Luetin.	*Surgeon, U. S. N.*

The nature of the disease syphilis has been explained to me and I am convinced that I have this disease. I have been told prolonged treatment and several tests will be necessary for a cure. I am anxious and ready to take such treatment as may be necessary.

Date. Sig. of patient.

SERUM REACTIONS.

Date.	Reaction.	Where made.

OBVERSE.

NOTE.—The dimensions of this page are altered for facility in printing. The finished form conforms to the size of sheet used in the health records, 9⅞ x 4.

ABSTRACT OF TREATMENT OF..

Place.	Date.		Mercury, salvarsan, etc. Dose, method, etc.	Sig. of med. off.
	From—	To—		

MARINES WOUNDED DURING THE DRIVE ON SANTIAGO, SANTO DOMINGO.[1]

By H. F. STRINE, Surgeon, United States Navy.

Santiago, the only fortified town in the interior of the Dominican Republic, has two outlets through the surrounding mountains to the northern coast—one by a narrow-gage railroad, 43 miles to Puerto Plata, the other a wagon road about 80 miles to Monte Cristi. These two roads run parallel for a distance of about 12 miles, diverging at Navarrete.

In June, 1916, this stronghold, with its approaches, was held by revolutionary forces under the leadership of Desidirio Arias. A marine expeditionary force, consisting in all of about 1,200 men, was ordered to advance on Santiago and capture the revolutionary leaders. For military reasons Monte Cristi was selected as the base of operation and the road leading from there the line of advance. The drive started on June 26, and about the same time a detachment of marines left Puerto Plata to work their way along the railroad and join the main force at Navarrete.

The hospital ship *Solace* anchored off Monte Cristi to serve as a base hospital until the expeditionary force had succeeded in reaching Santiago and establishing a regimental hospital at that place.

Both lines of advance joined forces at Navarrete on July 4, having encountered resistance at several points along the road where bands of revolutionists had entrenched behind excellently screened natural fortifications. In forcing these passages 3 marines were killed and 12 wounded to the extent that they required hospital attention. Both dead and wounded were transferred by motor truck and automobile to the base and then by boat to the *Solace*. About July 5 the revolution collapsed and the expeditionary force entered Santiago without further resistance.

Three of these 12 cases of gunshot wounds are of considerable interest; they represent distinct types of important surgical problems on which considerable light has been thrown by the experience acquired in the past two years of the European war.

First, the question of dealing with foreign bodies, metal or bone, imbedded deeply in the brain. Powerful magnets and magnetic probes have been of service in removing fragments of shell or bullets, but with bone fragments no such method is possible; blind attempts to remove them is a dangerous procedure, and they all are very likely to form late abscesses if left.

Second, the management of comminuted gunshot fractures of the humerus and femur, also the question of gas infection. Bone plating with a metal plate in open infected fractures is probably seldom advisable. However, this particular case (Case II), which later on developed a gas infection, appeared at the time of operation to warrant it, and with wide-open continuous irrigation drainage in the presence of a virulent infection no delayed union or necrosis followed and a good alinement was secured. The incision beneath the skin was entirely through muscle tissue, with practically no fascia planes along which the anaerobic bacteria could rapidly pass—which probably accounts for the ease with which the infection was controlled.

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[1] See reports of Surgeon F. L. Benton and Passed Assistant Surgeon K. C. Melhorn, U. S. Navy, on pages 114 and 117.

Third, early thigh amputation as a life-saving measure in a case of comminuted gunshot fracture of the femur, extensive muscle and popliteal laceration, with virulent infection involving the knee joint, such as later described in Case III, probably needs no comment.

Case I.—J. E. D., M. C. Compound gunshot fracture of the skull, with damage to the brain by detached pieces of bone acting as secondary missiles.

Patient was wounded in action near Navarrete and was received on board the *Solace* four days later, presenting symptoms of infection with those of cerebral compression. A scooped-out, guttered wound of the scalp and cranium over the right frontal eminence, parallel with and about 1 inch from the median line, was discharging pulpified brain tissue. A roentgenogram showed an extensive fracture line, with numerous small and three large irregular fragments of bone lodged deeply in the right anterior quadrant of the brain; the bullet was deflected from the cranial cavity. Temperature 102°, pulse 50, leukocytes 20,000; no paralysis; pupils equal in reaction; conscious, but would answer questions very slowly, only in monosyllables after the questions had been repeated, and was suffering from severe headache.

Patient was etherized, scalp shaved, and a curved incision made backward and downward from the wound to a point in front of the ear. The fracture line extended from the opening in the skull backward into the parietal bone about one-half an inch beyond the coronal suture, then backward and downward to the squamoparietal suture. From the anterior angle of the wound a fracture line extended forward, then downward and backward to the frontosphenoidal suture. A trephine opening from which to work was made in firm bone at a short distance from the exposed brain, and after clearing the fracture line for about 2 inches with a pair of Dahlgren's forceps, the traumatic osteoplastic flap could be lifted and turned back, exposing the dura. A quantity of bloody, septic material along the fracture edges was now removed and bleeding points controlled. There was no appreciable clot above or beneath the dura; after the flap was lifted, however, a brisk hemorrhage occurred from a meningeal branch. The dura was under great fluid tension and a small opening

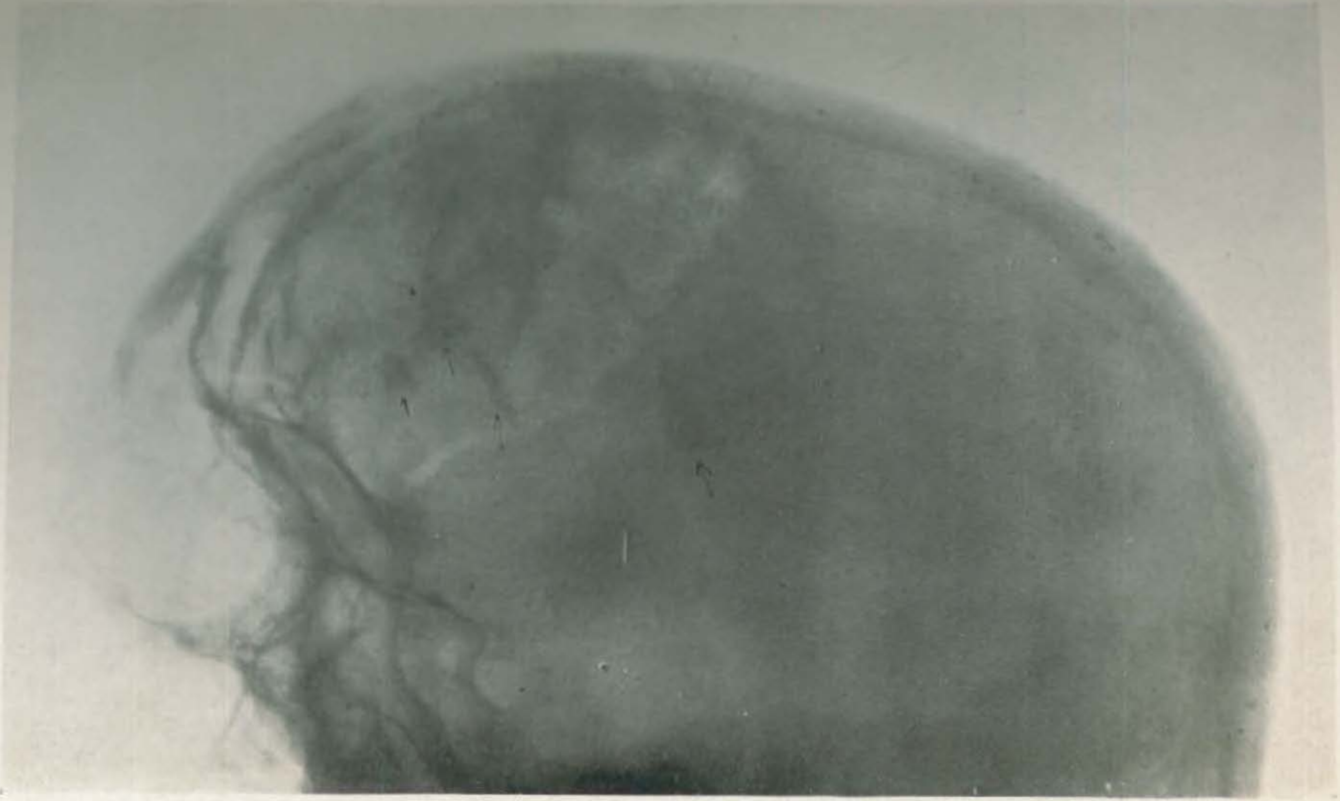

Fig. 1.—Gunshot fracture of skull (see page 31), showing location of the fragments of bone in the brain.

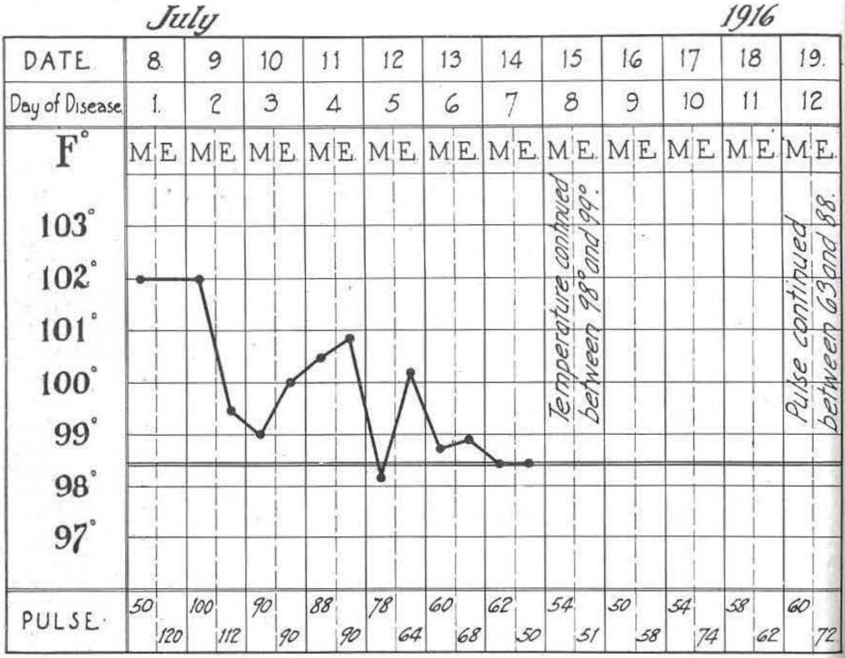

Fig. 2.—Postoperative temperature chart from Case I, gunshot fracture of skull. (Same as figures 1 and 3.)

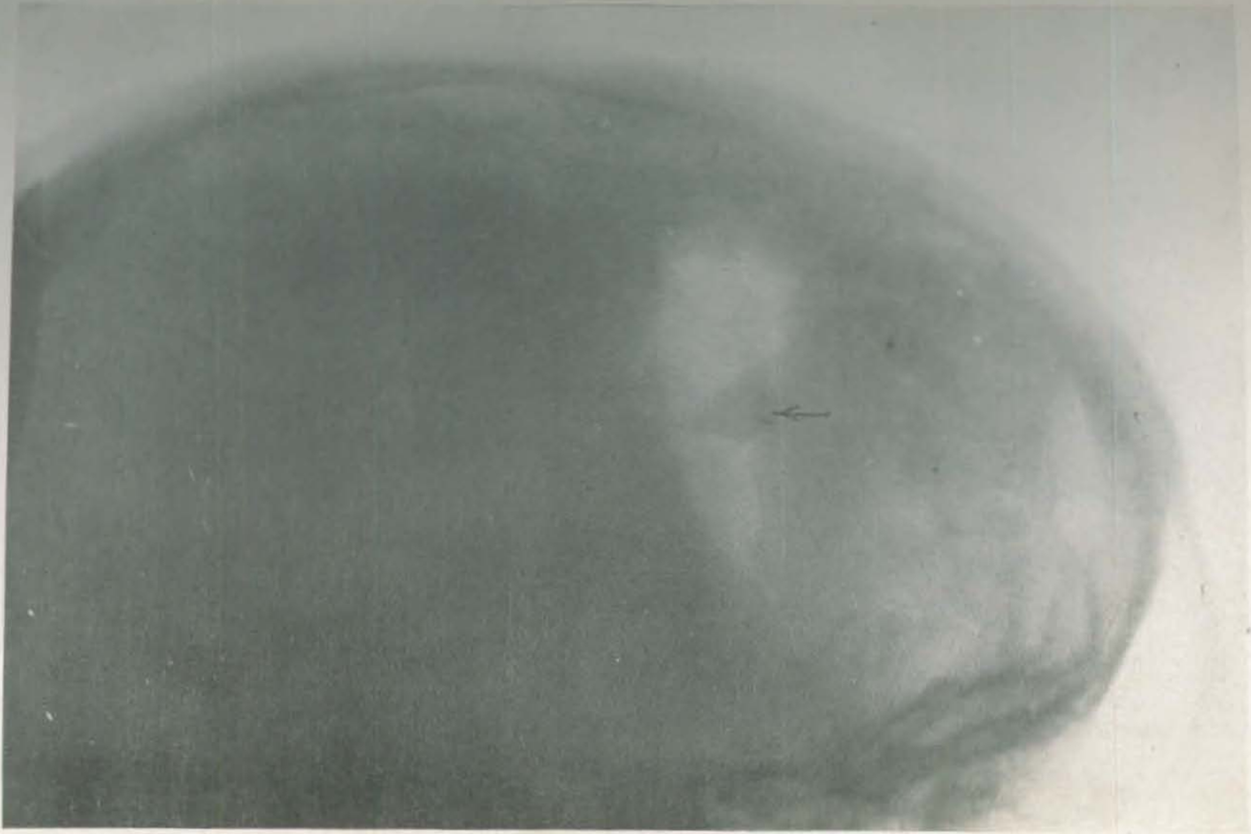

Fig. 3.—The same case as figure 1, four months later.

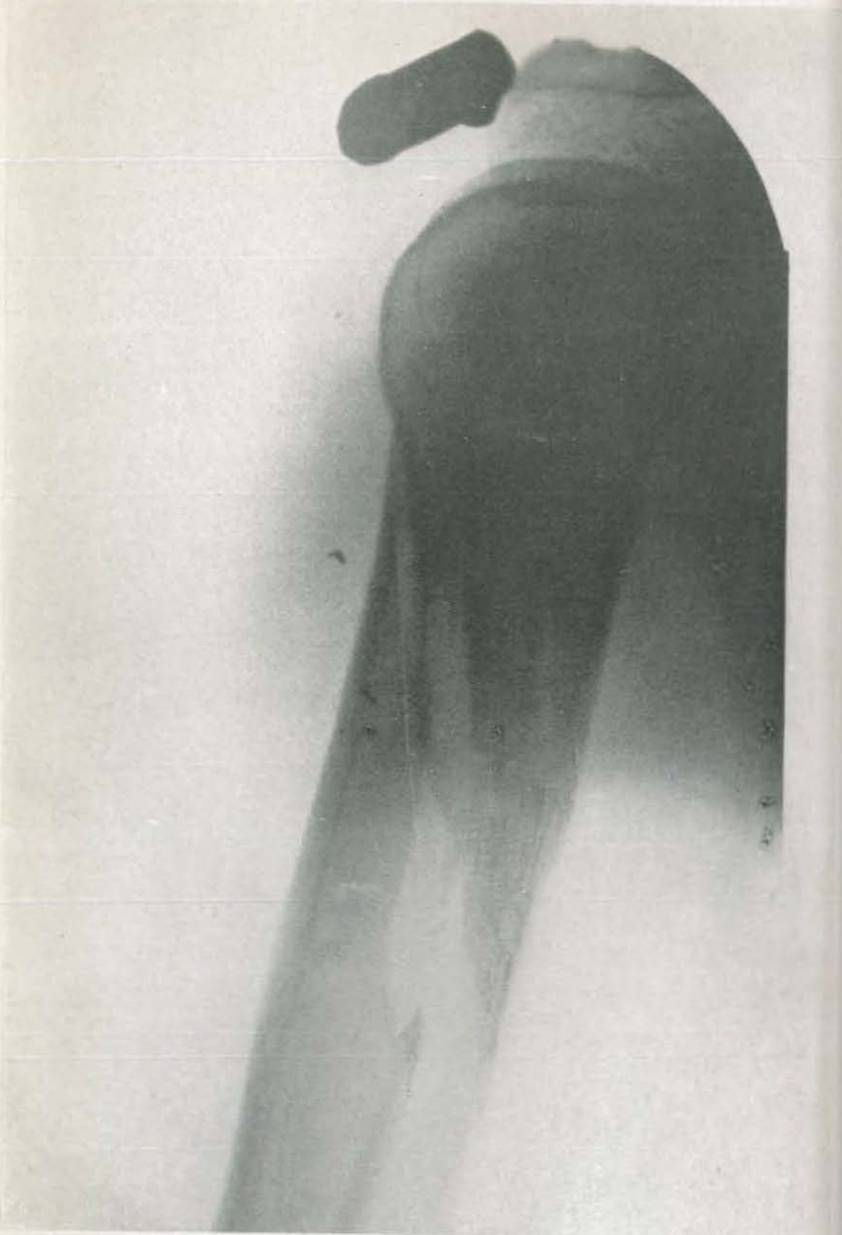

Fig. 4.—Compound gunshot fracture of left humerus with gas infection. (See page 32.)

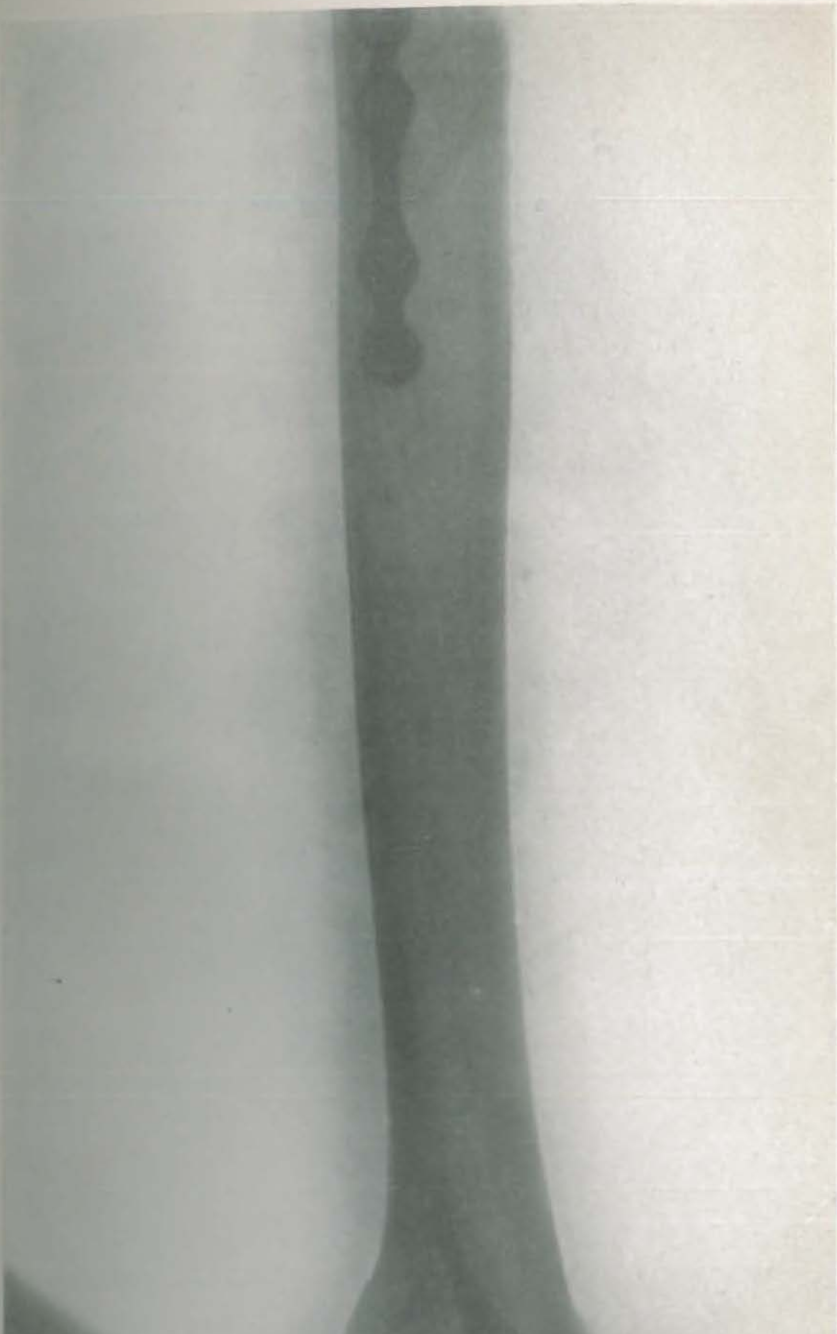

Fig. 5.—The same case as figure 4, five weeks later.

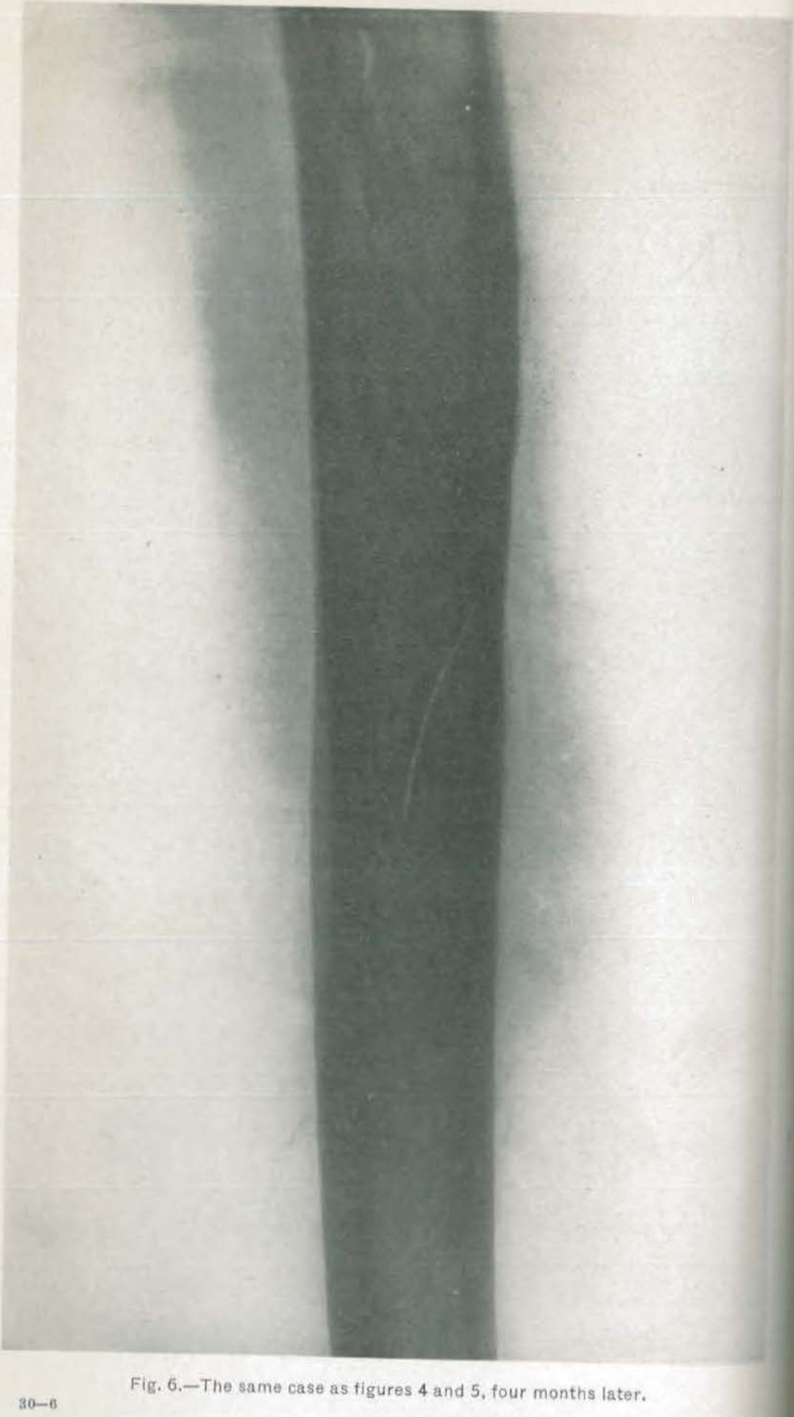

Fig. 6.—The same case as figures 4 and 5, four months later.

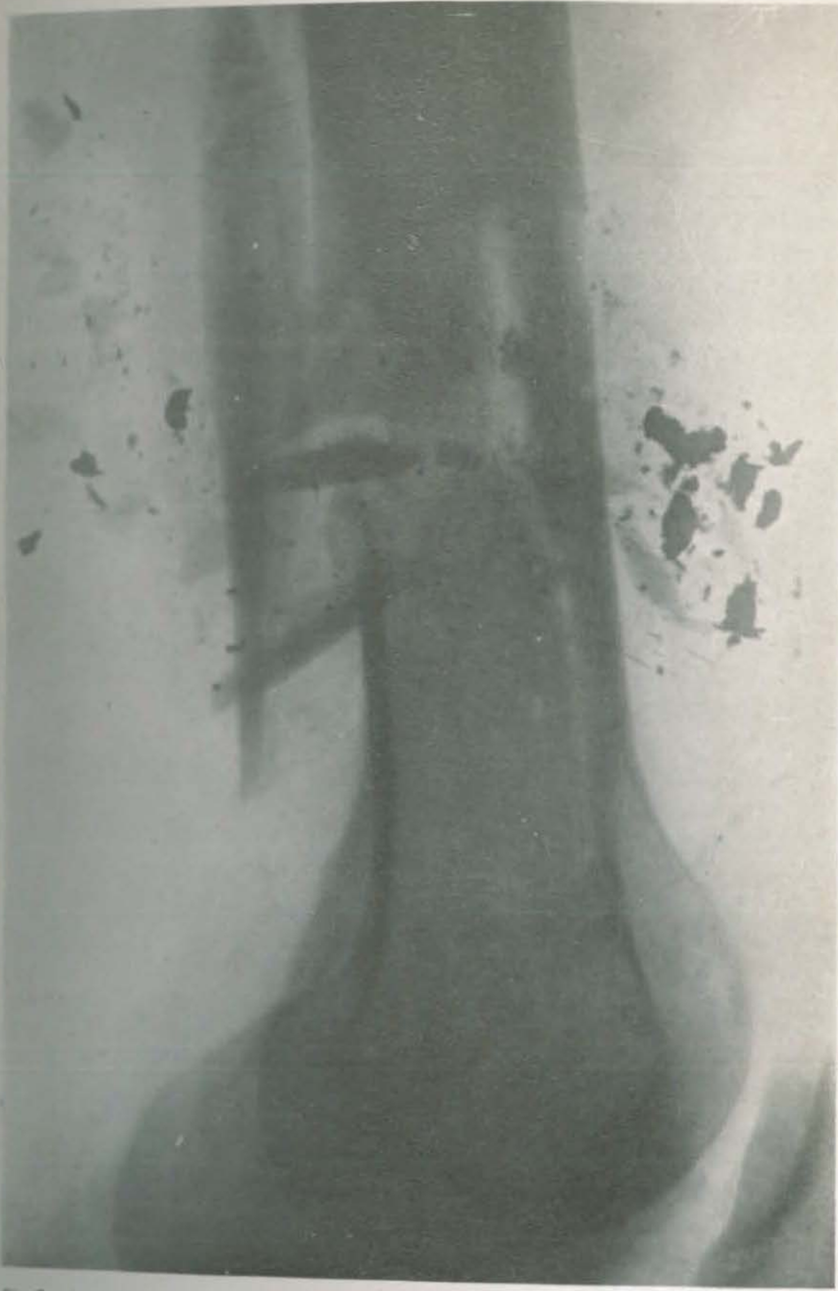

Fig. 7.—Compound comminuted gunshot fracture of lower end of right femur, opening the knee joint. (See page 33.)

was made about 1½ inches from the lacerated brain area, relieving the intracranial pressure. The cerebral fluid that escaped was probably not infected, although it appeared so at the time.

Several small superficial fragments of bone were removed, but no attempt was made to locate or remove the deeper ones. The osteoplastic flap was replaced with drainage at both angles of the wound and a small rubber tube placed to the opening made in the dura.

After the first week the increasing intracranial pressure, from developing brain abscesses, became noticeable in the appearance of the wound; the osteoplastic flap bulged more and more, causing the skin sutures to cut through, and a hernia cerebri slowly developed, reaching the size of a tennis ball by the end of the fourth week. From time to time a quantity of pus discharging an occasional small spicule of bone would break through this protruding mass of diseased brain, close over, and again break through at a distant place.

About the end of the sixth week the hernia began to retract, so that one week later there was, instead of a protrusion, a narrow, irregular, deep, intracranial cavity running downward and backward connecting with the original locations of the fragments of bone shown in the X-ray plate (fig. 1).

The postoperative course of this case presented interesting clinical features more or less typical of the pathological conditions; he never complained, would eat any quantity or quality of food given him, his abdomen remained scaphoid with marked constipation; there were two attacks of vomiting, each lasting about 36 hours—the first, cerebral in character, occurred during the third week, the second, attributed to seasickness, but indefinite, about one week later. There was never observed any degree of motor or sensory paralysis or irritability, and the spinal fluid on three different aspirations was apparently not increased in quantity. He was conscious at all times, but mentally sluggish, answering questions only in monosyllables and volunteering no information whatever; he would hold an open book upside down and gaze at it for hours. With the receding brain tumor all these symptoms cleared, abdominal muscles relaxed, bowels moved daily; he became mentally more and more alert and his brain began registering acts (fig. 2).

Present condition.—Four months after the injury his weight is normal and, according to his statement, has no headache. He is properly oriented as to time and location, memory good up to the day he was injured—he remembers in a hazy way that he had breakfast and was detailed with a machine gun squad, but nothing more. There is an absolute mental blank from the time of injury until some time during the fourth week. Pronounced mentally normal by the alienist of the Washington Naval Hospital. Apparently all the fragments except the large triangular one, now visible in the bottom of the sinus and gradually working to the surface, have been discharged (fig. 3).

Case II.—A. V., M. C. Compound gunshot fracture of the left humerus, with gas infection. A large ragged wound of entrance on the outer aspect of the arm at the junction of the upper and middle thirds. Arm and shoulder ecchymotic and swollen, roentgenogram examination (fig. 4) showed an oblique fracture of the bone with misplaced fragments and a 13-mm. lead bullet lodged beneath the acromion process. Wound 36 hours old, infected, and the patient was becoming septic.

Under ether a 4-inch incision was made parallel to the deltoid fibers, exposing the fragments, the bullet removed, infected clots and devitalized tissues cleared away, and the entire wound flushed with Harrington's solution, followed by saline. The bone fragments were brought together and held in place with considerable difficulty. A Lane bone plate was considered the best means for retaining apposition, with open drainage over the plate, the upper end of the wound was sutured, with a rubber tube leading to the bullet cavity beneath the acromion. The joint cavity was not opened by the bullet.

Forty-eight hours later the patient was septic, nauseated, and complained of feeling faint; overnight the pulse jumped from 85 to 120. The wound was exposed and a gas infection noticed. The skin crepitated along the border of the upper half of the wound, there was a bloody serous discharge with gas bubbles of characteristic odor escaping, which the laboratory reported as being practically a pure culture of an anaerobic bacillus from culture and rabbit inoculation—probably the *Bacillus aerogenes capsulatus* of Welch. The wound was laid wide open and bathed continuously for 24 hours with a solution of hydrogen peroxid. The following morning there was no advance in the infection and 36 hours later active evidence of gas infection had practically disappeared. Continuous irrigation with a hypertonic salt solution was now used and the temperature from this time on remained normal. The bone united as though there had been no infection present in the wound. The plate was removed at the end of five weeks (fig. 5). Four months later he has good joint movement and is able to perform duty (fig. 6).

Case III.—F. L. B., M. C. Compound, comminuted, gunshot fracture of the lower end of the right femur, opening the knee joint. Patient was shot in action on the Puerto Plata line of advance, remained about 16 hours in the jungle, was then transported by stretcher bearers 2 miles, then by freight car 17 miles to Puerto Plata. He was received on board the *Solace* about 40 hours after the injury in a very weak condition from the effects of shock, loss of blood, and infection. The leg was swollen enormously and the knee joint distended with fluid; the wound of entrance was anterior in the median line 2 inches above the upper border of the patella, a large ragged wound of exit posterior in the popliteal space 1 inch external to the median line. X-ray examination (fig. 7) showed extensive comminution of bone, with fragments of the exploded bullet and bone riddling the tissues. The joint was aspirated, and bloody, infected fluid withdrawn. The extent of laceration of the soft tissues and bone, the presence of an active infection involving the knee joint, and the ideal conditions for gas infection with the probability of secondary hemorrhage from damaged popliteal vessels made amputation of the leg advisable as a life-saving measure. Hoping to lessen the danger from operative shock, an effort was made to improve his general condition by administering morphin and about 1,500 mils of saline solution with glucose and sodium bicarbonate. At 3 p. m. his temperature was 101.5°, pulse 110, irregular, with but little improvement, and operation was performed without further delay. Amputation was performed through lacerated tissues in the middle third of the thigh and free open drainage provided. Shock was profound; however, he slowly reacted and convalescence proceeded uneventfully.

Examination of the amputated leg showed very extensive destruction of the muscles above the knee with pulpification of the tissues in the popliteal space, the large vessels being practically unsupported, and a longitudinally split condyloid fracture opening the cavity of the knee joint, thus accounting for the infected bloody synovial fluid.

Case IV.—O. J. J., M. C. Gunshot wound of the face and neck by a 13-mm. lead bullet on July 3. Admitted to the *Solace* July 7. Wound of entrance right inferior maxillary region; the bullet passed backward through the deep structures of the neck, was then deflected downward by the heavy fascia of the back and lodged opposite the middle of the posterior border of the scapula. The bullet was removed from an infected pocket beneath the skin. No complications. Discharged to duty on August 14.

Case V.—C. O., M. C. Gunshot wound of the left scapular region on July 3. Wound of entrance and exit 3 inches apart, injuring only skin and fascia. Discharged to duty August 9.

Case VI.—W. J., M. C. Comminuted gunshot fracture of lower end of left radius by a 7-mm. steel-jacketed bullet on July 3. The bullet struck the bone and exploded, the deformed steel jacket passed upward through the muscles of the forearm and made its exit 3 inches below the elbow. Admitted to the *Solace* three days later with severe infection of the tissues around the wrist joint and lower half of the forearm. X-ray showed comminuted bone with a fracture line extending to the articular surface. Under ether the lower end of the radius was exposed, the lead fragments removed, and thorough drainage provided with a rubber tube passed between the bones. At the present time (Nov. 7) the wound is healed; the wrist joint did not become infected. Full extension of the second and third fingers, from adhesions to extensor tendons, is not quite possible.

Case VII.—J. G., M. C. Gunshot wound of the right hand, palmar surface, on July 3; only soft tissues involved. The wound was infected. Discharged to duty August 14 with full use of hand.

Case VIII.—B. R., M. C. Traumatic amputation of the left thumb by an accidental self-inflicted injury with his own rifle. The stump was cleansed and a clean amputation performed at the metacarpo-phalangeal articulation, with primary union.

Case IX.—D. B. R., 2 Lt., M. C. Comminuted gunshot fracture of the metacarpal bone of the left thumb. No infection followed and he was discharged on leave at the end of the third week.

Case X.—F. R. P., M. C. Perforating gunshot wound of the left thigh, with no bone or vessel involvment on July 3. The wound became mildly infected. Discharged to duty August 14.

Case XI.—G. E. M., M. C. Gunshot wound of entrance of right thigh, 4 inches above the patella, on July 3; the bullet lodged under the skin on the posterior aspect of the thigh, where it was removed. There was no bone or important vessel injured. The wound healed after mild infection. Discharged to duty August 19.

Case XII.—J. A. G., M. C. Perforating gunshot wound of the left knee by a small, high-powered, jacketed bullet on July 3. No infection followed. There was evidence of a detached articular cartilage, and an excess of fluid persisted in the joint cavity for six weeks. He was discharged to duty September 7 with normal joint function.

STRYCHNIN-STOVAIN SPINAL ANESTHESIA.

A visit to the clinic of Dr. Thoma Ionnescu, Bucharest, Roumania.

By E. P. HUFF, Passed Assistant Surgeon, United States Navy.

During a recent visit to Bucharest, Roumania, the writer had the pleasure of witnessing a special clinic, given for his benefit, by Dr. Thoma Ionnescu (Thomas Johnnesco), in which stovain as an analgesic in general surgery was demonstrated.

While, so far as could be ascertained in Bucharest, contemporary surgical opinion does not entirely bear out the enthusiastic claims of the originator of stovainization, the fact that it is the only anesthetic employed in the chief hospital of the city (the Eforia Civil Hospital), and that, as it is claimed, not a single death has occurred as a result of the administration of stovain in the complete series of over 10,000 operations performed in this hospital by Dr. Ionnescu and his assistants during the several years since its introduction, lends considerable weight to the contention of the originator as to the safety of the method in the hands of the ordinarily careful surgeon.

That alarming symptoms do occasionally occur is frankly admitted by Ionnescu, but he has devised simple means of so successfully combating all these that now he administers the analgesic into the spinal canal with as little concern as one would ordinarily undertake local cocainization.

Dr. Ionnescu speaks most enthusiastically of his visits to the United States and of the many interested witnesses to the several demonstrations he gave there of his method; but he feels that American surgeons are still not sufficiently convinced of its great value, owing possibly to his lack of knowledge of English and his consequent inability to drive home his arguments, and is most anxious to renew his American acquaintanceships as soon as the cessation of the present European conflict and the uncertain state of Roumanian politics will again render justifiable his leaving his country.

With the belief that the method may be of value to the Medical Corps of the Navy, a short description is given of the clinic witnessed, as well as a translation of Dr. Ionnescu's latest monograph on his method as applied to the special needs of military surgery in the field.

The clinic developed many surprises in addition to the rather startling effects of the anesthetic. Dr. Ionnescu himself is of no little interest. He is a man of medium height, in the neighborhood of 50 years of age, and slightly gray, quick and positive in his movements, and of a very impressive manner. He pays particular regard to his personal appearances, as is evidenced by his neatly curled mustache, monocle, fashionably tailored clothes, and cane, and the great deference shown him by his assistants indicates his ability to impress others with his personality and his views. He is fond of a joke, is a good talker, and seems to inspire his patients with unbounded confidence. As an operator he appears to be a perfect master of his subject, is quick and resourceful, and speaks with justifiable pride of his numerous ingenious inventions of instruments, etc. He is, of course, most enthusiastic in his claims for stovain and believes that it is the ideal universal anesthetic, which will in time become generally recognized as such. The method seems to be quite as successful in the hands of his assistants as of himself and, as stated, is the only anesthetic employed in this large hospital in which he is recognized as chief.

The cases operated were not especially selected, as the short notice did not permit of the accumulation of special cases. Apologies were offered that no brain cases were available for demonstration, as it was explained that in these the results were more interesting.

The costume worn by the surgeon and his chief assistant consisted of pajamas, a pair of loose canvas boots reaching to and tied below the knees, a gauze mask, suspended from a sort of spectacle frame and tied about the neck, which completely covered the lower part of the face (a very satisfactory arrangement), a linen skull cap, and a long sterile gown with sleeves tied about the wrists and which was donned after the hands were scrubbed.

The operating table used is one adjustable to all possible positions with simple movements, and is especially arranged for the Trendelenburg position which is most important with the use of stovain. A special feature of the table is the supports for fixed abdominal retractors devised by Dr. Ionnescu—broad retractors supported by brackets on the sides of the table and adjustable as to height and lateral position by the sterile hands of the operator and his assistant. This is a most ingenious arrangement, and not only dispenses with an assistant holding retractors but gives a better view of the field of operation and supports the patient steadily in a fixed position. The Trendelenburg position, combined with the absolute relaxation of the abdominal muscles under stovain, allow the abdominal contents to gravitate to the upper part of the cavity, giving the best possible exposure in pelvic operations. The instruments used are all of French manufacture, another evidence of the great admiration the Roumanians exhibit for the French and which amounts to a very apparent imitation, Bucharest being often spoken of as the Little Paris of Europe.

Most startling was the method of hand sterilization practiced, merely the scrubbing of the hands for from 10 to 15 minutes with a nailbrush, liquid soap, and sterile water. Dr. Ionnescu says that he believes that disinfectants are quite useless and often harmful on the hands, and the most surprising thing about his argument is that he has no infections. He does not wear gloves for the same reason, and besides he says that they are now impossible to obtain since the war began. The patient's back and the field of operation were sterilized by a preliminary swabbing with formol-alcohol 2 per cent. followed by a swabbing with absolute alcohol.

The syringes and needles were boiled and the analgesic prepared as described in the following report. Difficulty was encountered in one case in giving a cervical injection, but this was overcome on the second trial. In all other cases the injection was made with the utmost facility, and the patient was immediately ready for operation, a remarkable contrast to a prolonged ether anesthetization. Following are a few of the cases operated:

Lipoma of shoulder.—Middle-aged man with lipoma of the left shoulder, about half the size of the head. Cervical stovainization. Patient discussed the operation during its entire progress. Color remained normal, and there were no signs of shock or discomfort.

Hysterectomy for fibroids.—Middle-aged Jewish woman. During the course of the operation the patient became mildly hysterical and repeatedly asked for water. Skin became pale and there were evidences of moderate shock or fright. Dr. Ionnescu explained that this was the usual experience with the Jewish people with whom they had to deal, being a combination of fear and hysteria sometimes simulating rather alarming symptoms. This patient recovered from the effects of the anesthetic without special treatment. The abdominal wound in this patient was closed with three iron-wire sutures (silver wire not being at present obtainable), the ends of the wire being brought out at one side of the wound and secured by twisting the ends together around a roll of gauze. The skin edges were closed with a few coaptation sutures.

Gastro-enterostomy.—Middle-aged, highly emaciated man, with nonmalignant stenosis (ulcer) of pylorus. Posterior gastro-enterostomy by a one-suture method devised by the operator, with following steps: First, preparatory fasting for 24 hours; second, median incision; third, exposure of posterior wall of stomach through transverse mesocolon; fourth, coaptation of gut and stomach surfaces by means of double clamps; fifth, longitudinal incisions in gut and stomach walls through the serous and muscular coats only; sixth, long continuous silk suture in posterior edges of cut serous and muscular coats; seventh, cutting through the mucous coats and trimming the rough edges; eighth, continuation of the suture around the ends and anterior cut seromuscular edges (no suture whatever of the mucous edges); ninth, removal of the clamps; tenth, a few stay sutures at the two extremities of the wound; eleventh, suture of the gut to the opening in the mesocolon; twelfth, closure of the belly wound with three wire sutures. Patient apparently suffered little, if any, shock, and made no complaints during the operation.

Following is a translation of the article in question:

RHACHISTRYCHNOSTOVAINIZATION IN MILITARY SURGERY.

By Prof. Dr. THOMA IONNESCU, Dean of the University of Bucharest.

Rhachianesthesia is the ideal method of anesthesia on the battlefield. It can be easily and rapidly performed, produces an almost instantaneous anesthesia, and can be administered at the same time to several wounded men. It produces no harmful results and has none of the contraindications of other anesthetics.

The technic is simple. The instruments consist of a syringe, preferably one of a capacity of 2 mils, and of long platinum needles.

The disinfection of the surgeon's hands.—On the battlefield the usual method of disinfecting the hands (with sterilized water, soap, and nailbrush for from 10 to 15 minutes) can not be carried out. Disinfection may be done instantaneously, however, by washing the hands with one of the following substances: Alcohol-formol (2 per cent formaldehyd), simple absolute alcohol, tincture of iodin, iodized benzin, or even petroleum (refined oil). These substances insure a sufficient disinfection of the hands.

The surgeon has to take care, however, to keep his hands clean at all times, that is, not to touch infected wounds without gloves or, in case of the want of them, to work only with instruments.

Position of the wounded.—To perform the rhachianesthesia, the wounded man is put into a sitting position (as in sitting in a chair). The head is bent forward until the chin touches the chest, and the vertebral column is bent forward as much as possible. The legs are stretched out, the hands resting on the knees.

In this position the spinous apophyses of the vertebrae, the landmarks for the puncture, are made prominent.

In the case of gluteal wounds, rupture of the femoral vessels, fractures at the neck of the femur, etc., which do not permit of the sitting posture mentioned above, the wounded man is laid down on the healthy side, bending the head and vertebral column strongly forward. The puncture is made with the same ease as with the patient in the vertical position.

Disinfecting the site of the puncture.—The region where the puncture is to be made is disinfected over a large area. In case the patient is very dirty, the region is first wiped with sterilized compresses soaked in benzin or ether. The skin is thus cleansed and all grease removed. After this, the whole region is moistened with one of the following substances: Alcohol-formol, absolute alcohol, tincture of iodin, or petroleum. A single brushing is sufficient.

Disinfecting the instruments.—The syringes and the needles are best sterilized by boiling them in a 5 per cent solution of carbonate of sodium. In the absence of this, bicarbonate of sodium or even a solution of common salt, in a strength of 10 per cent, can be used.

The syringes are boiled dismounted, that is, with the pistons removed and preferably wrapped in cotton. The needles are boiled at the same time with their mandrels or wires inside, otherwise they are easily clogged. The syringes can be boiled in their boxes or trays, or in baskets in any other vessel. The instruments boiled for 10 minutes are perfectly sterile. In an emergency the syringes may be sterilized by sucking through them alcohol or benzin, and then a solution of strychnin, which is afterward thrown away.

If one has but few needles and is obliged to perform several rhachianesthesias at the same time, the needles may be flamed after each operation. In case of extreme urgency and an insufficiency of syringes, one can employ the same syringe, once sterilized, on several wounded, provided it be washed out with a solution of strychnin each time before using it.

Preparing the solutions.—The extemporaneous preparation of the solutions of strychnin and stovain insures them great stability with constant and safe results.

If one has not at hand the "Racovitza" ampules and is obliged to use the stovain and strychnin in bulk, let the apothecary prepare packets of stovain containing 0.05, 0.04, 0.03, 0.02, and 0.01 cg.

The solution of strychnin is prepared in quantities of 100 mils, in strengths of 0.001 and 0.002 mg. per mil of sterilized water; that is, a 0.1 or 0.2 per cent solution. There is no need of distilled water. The determined amount of stovain for each injection is put into a small sterilized vessel and over it is poured 1 mil of the strychnin solution; it is now warmed a little over a spirit lamp and, after it has dissolved, is drawn up into the syringe. It is not necessary that the stovain be further sterilized.

All the sanitary equipments [of the Roumanian Army] contain the "Racovitza" preparations ("ampulla synèses Ionnesco"). These preparations are put up in cardboard boxes containing one row of ampules of cystallized stovain and another row containing the strychnin solution. The phials of strychnin solution contain 3 mils of the solution, each mil being equal to 0.001 or 0.002 mg. of strychnin.

Indicate to your assistant the dose of stovain and that of strychnin which you think necessary. Verify this yourself by reading the label on the phial to see if the demanded dose has been given you.

The syringe is now mounted and the needle fixed in its place.

With the file accompanying each box, the assistant cuts the tip of the phial containing the strychnin solution and flames it a little to sterilize it. Take exactly 1 mil of the strychnin solution into the syringe.

The assistant now takes the phial containing the stovain, cuts the tip in the same manner, and sterilizes it in the flame. He presents you the phial, and you now introduce the needle inside and pour in the 1 mil of the solution of strychnin which you have in your syringe.

The stovain dissolves readily, but to hasten the dissolution it is well to warm the phial a little over a spirit lamp.

The stovain being completely dissolved (this can be recognized when no stovain is visible), again introduce the needle and withdraw the contents. You now have in the body of the syringe the solution of stovain-strychnin ready for injection.

Dismount the needle slowly from the syringe and put it in the box lid or vessel which served for the sterilization.

The puncture of the spinal canal.—The wounded man being placed in the position indicated above, determine with the finger-nail of the left hand the space between the two spinous apophyses at the point where you desire to make the puncture. Keep the thumb fixed on the tip of the apophysis immediately below the site of the puncture. The needle being held between the balls of the thumb and forefinger of the right hand, arrange it horizontally and perpendicularly to the surface, exactly over the thumb-nail of the left hand—that is, immediately over the inferior spinous apophysis.

Push the needle slowly in a direction from behind forward, keeping it always in the same position. The needle enters with some resistance through the skin, especially after the application of tincture of iodin. Immediately after passing through the skin it slides easily without any resistance. At a certain moment you hear a weak crackling, and you have the sensation as if you had pierced an india-rubber ball. This is a sign that you have gotten into the arachnoidean space, and the cephalorhachidian fluid, clear as spring water, begins to run in drops or in a strong jet, which is a proof that the puncture is well done.

Difficulties: (*a*) The needle passes through the skin, but is stopped immediately by a resistant surface. It is useless to attempt to push the needle farther, as it has impinged against a vertebral lamina. Draw it back and puncture afresh, after determining again the space between the vertebral apophyses.

(*b*) You have the impression that the puncture has been well done, but still the liquid does not run. Probably the needle has become plugged with a particle of skin, or, as is more often the case, with cartilage. Introduce the mandrel (needle's wire), and upon withdrawing it the liquid will begin to flow.

(*c*) If still the fluid does not run, it may be that you have gotten in too deep and have punctured the cord. This is of absolutely no importance. Or again, you may not have reached the dura mater. In the first case, draw the needle slowly back; in the second, push it on very slightly.

(d) Instead of a flow of cephalorhachidean fluid, blood runs from the needle. Nothing serious has happened, probably you have pierced a medullary vein. After a few moments blood mixed with the liquid runs out, and afterward clear liquid.

These small difficulties disappear after an experience of several rhachianesthesias.

The injection of the stovain-strychnin solution.—The cephalorhachidean liquid flows well. Take the syringe in the right hand. With the left hand support the needle and slowly fix to it the tip of the syringe

Hold the syringe thus fixed with the left hand and draw the piston with the right hand. The cephalorhachidean liquid enters into the body of the syringe and mixes with the solution. Now slowly push home the piston. After the syringe is emptied again pull the piston; the syringe is again filled and with great ease. The puncture and the injection was well done and the anesthesia is assured.

Difficulties: (a) You have fixed the syringe to the needle and drawn the piston, but the syringe does not fill. It is certain that the needle has shifted and is between the dura and the bone. Push the needle in a little and the liquid comes.

(b) The injection has been properly done, but at the end, on pulling the piston, no more cephalorhachidean liquid comes. Probably during the injection or at its end the needle has shifted and the solution is not in the right place. The anesthesia is doubtful. Wait 10 minutes, and if the patient shows no signs of anesthesia, make a new puncture and inject a new quantity of the anesthetic. This will occasion no inconvenience.

The position of the wounded man after the injection.—After the injection the patient is placed at once in the dorsal decubitus.

With the mediocervical injection the head is placed lower than the body.

With the upper dorsal injection the head is placed a little higher than the body.

With the dorsolumbar injection, for an operation on the thorax, the patient is placed in a slightly inclined position, the legs a little elevated, the body and head a little lowered.

With an injection in the lumbar or lumbosacral region the body and the head should be slightly elevated.

If the anesthesia is not sufficient exaggerate these positions and it will follow at once.

The points at which the injections are made.—(a) For operations on the head (skull or face) the mediocervical puncture is made. This is determined by the eye, by taking the half distance between the external occipital protuberance and the visibly prominent apophysis, which corresponds to the sixth and seventh cervical vertebræ.

The needle is introduced perpendicularly to the surface and enters deep because it must pass through the thick stratum of the powerful posterior cervical ligament.

The liquid flows very slowly, and sometimes one is compelled to exert suction in order to make it flow.

(*b*) The neck, upper limbs, and the upper thorax are anesthetized with an injection in the upper dorsal region.

The puncture is made in the median line under the promontory. This point corresponds with the interspinous space between the first and second dorsal vertebræ.

Here the needle is also placed perpendicularly, but is directed little obliquely forward and from below upward. The needle penetrates deeply and the liquid flows slowly.

(c) The lower thorax, abdomen, scrotum, and the lower limbs ar anesthetized with an injection made at a point between the twelft dorsal and first lumbar vertebræ.

This space corresponds to the level which passes through the fals ribs. The hand is placed under the false ribs and a point is selecte in the median line at a finger's breadth above it. The puncture i made in the corresponding interspinous space.

The needle penetrates easily and the liquid flows out in a stron jet.

(*d*) The perineum, pelvis, and the organs contained therein ar anesthetized by an injection between the fourth and fifth lumba vertebræ.

This space corresponds to the level which passes through the cres of the ilium, determined by applying the hand to the crest.

The quantity of anesthetic.—At the first sanitary formatio on the zone of operations, at the regimental stations, and at th divisional and mobile hospitals, the wounded men are brought in i an extremely exhausted condition on account of lack of nourishmen excessive fatigue, loss of blood, and nervous shock. In these case the doses with which a good and sufficient anesthesia can be produced are reduced to a minimum.

1. For the mediocervical injection the maximum amounts required will be 0.02 cg. stovain and 0.001 mg. strychnin. In genera however, 0.01 cg. stovain and 0.001 mg. strychnin will suffice.

2. For the upper dorsal injection the same quantities are sufficien

3. For the dorsolumbar and lower lumbar injections a maximu of 0.03 or 0.04 cg. stovain and 0.002 mg. strychnin will suffice.

At evacuation hospitals, temporary bases, and at inland statio the doses required will be proportional to the general state of th wounded. If the general state is good, use:

1. 0.02 cg. stovain and 0.001 mg. strychnin for the mediocervic injection.

2. 0.03 cg. stovain and 0.002 mg. strychnin for the upper dors injection.

3. 0.04 cg. or 0.05 cg. stovain and 0.002 mg. strychnin for th dorsolumbar and the lower lumbar injections.

If the wounded be exhausted the minimum doses mentioned abo are to be used.

For cases of extensive hemothorax, pyohemothorax, and pneumothorax, and, in general, all cases presenting pleuropulmonary wound anesthetize by a dorsolumbar injection with a maximum quantity o 0.02 cg. stovain and 0.001 mg. strychnin.

Accidents of rhachianesthesia.—Rhachistrychnostovainization is accompanied by no serious accidents whatever, even in the hands of an inexperienced though thoughtful man.

It is not a universal remedy which saves from death a dying wounded man, and the fatal accidents reported are due to the fact that the rhachianesthetic was applied to cases where any possible assistance would have been absolutely useless.

The untoward symptoms which may follow immediately after the injection are pallor of the face, a feeling of illness, vomiting, and a momentary acceleration in the pulse rate with a diminution of the arterial tension. In cases of pulmonary wounds, and exceptionally with other wounds, there may be a decrease in the respiratory rate and even a temporary cessation of respiration.

The first symptoms disappear immediately. The stoppage of respiration is combated at once by the use of artificial respiration, when, after a few minutes, spontaneous respiration is resumed.

To raise the arterial tension and to prevent the stoppage of respiration it is recommended, especially with the upper injections, to give a few injections of caffein or camphorated oil prior to the anesthetic.

Cardiac syncope is never produced.

Accidents following some time after the injection of the anesthetic are unknown.

The rise in temperature usually attributed to the rhachianesthesia is due to the impurity of the preparations or faulty sterilization of the instruments or the hands of the operator.

Persistent headaches following the injection are usually an indication of syphilis.

Cases of nephritis are sometimes accompanied by anuria, which disappears after proper treatment.

Indications.—It is an uncivilized practice to refuse the benefits of an anesthetic to the wounded.

Any surgical assistance given to a wounded man ought to be preceded by rhachianesthesia.

Fractured limbs should be placed at the beginning in good positions to avoid complications during transport and vicious unions. A good arrangement of the fragments can not be accomplished except under rhachianesthesia.

Contraindications.—There are none excepting in those cases where medical assistance is useless.

The following is a translation of the sheet of instructions accompanying each box of the ampules prepared according to the ideas of the originator of the method:

MANNER OF EMPLOYING THE "SYNÈSE" AMPULES OF PROF. DR. THOMAS JOHNNESCO.

To make a solution of a determined strength in order to produce general anesthesia with the stovain-strychnin ampules "Synèse," of Thomas Johnnesco, one proceeds in the following manner:

First take an ampule containing the solution of strychnin sulphate of a strength which you wish to employ, and open it by means of the file which you will find in each box.

Now, by means of a syringe of 1 mil capacity, with needle attached and previously sterilized by boiling, aspirate a small amount of the strychnin solution in order to rinse out the syringe and needle and free them from any adherent impurities (filaments of cotton, dust, etc.). Again empty the syringe, throwing away the contents, and then aspirate exactly 1 mil of the strychnin solution which is now introduced slowly into a previously opened ampule of stovain of determined strength. Agitate the ampule in order to hasten the dissolution of the stovain in the strychnin solution. In a cold solution the dissolution takes place at the end of two or three minutes, and almost instantaneously if the ampule is held a few seconds in hot water. However, since the dissolution in a cold solution takes place so rapidly, the heating is superfluous.

The preceding steps finished, the solution is ready for injection without further sterilization.

Example.—Suppose that we wish to make an anesthetizing solution containing 8 cg. of stovain and 2 mg. of sulphate of strychnin per mil. We aspirate, by means of a syringe of 1 mil capacity, the solution of strychnin and introduce it into an ampule containing 8 cg. of crystallized and sterilized stovain.

The strengths of the strychnin solutions.—A solution containing 20 cg. of strychnin sulphate in 100 mils of water contains 2 mg. of the salt in each mil of the solution.

A solution containing 10 cg. of strychnin sulphate in 100 mils of water contains 1 mg. of the salt in each mil.

A solution containing 5 cg. of strychnin sulphate in 100 mils of water contains 0.5 mg. of the salt in each mil.

Remarks.—For adults doses of 3, 4, 5, 6, 7, and 8 cg. of stovain are used in producing the inferior (dorsolumbar) anesthesias.

The dose of strychnin sulphate should not exceed 2 mg. per mil in this region.

For adults doses of 2 cg. or 3 cg. of stovain are used in the superior (cervical) anesthesias.

In this region the dose of strychnin sulphate should not exceed 1 mg. or 1.5 mg.

Sites of the punctures of the spinal canal to produce general anesthesia.—For the inferior anesthesias (the dorsolumbar point) the puncture is made at a point between the twelth dorsal and the first lumbar vertebræ.

For the cervical anesthesias (the superior dorsal point) the puncture is made between the first and second lumbar vertebræ.

DISEASES INCIDENT TO SUBMARINE DUTY.[1]

By R. W. McDOWELL, Passed Assistant Surgeon, United States Navy.

The medical officer in the United States Navy must pay special attention to hygiene and sanitation and must make prophylaxis watchword. Especially in the submarine service must he be a practitioner of preventive medicine.

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[1] Read before the New London Medical Society, New London, Conn., Nov. 2, 1916.

The small amount of space on a submarine limits the number of officers and men in the crew; each man has his assigned duty, and there are no reserves or "spares" as there are on the big battleships where there are always extra men ready to step in and take up the duties of any one disabled. Therefore each man on a submarine must be physically fit so that the boat will not be crippled by the lack of efficient and trained personnel.

The most frequent ailments seen by the medical officer in the submarine service are:

1. Effects of gasoline fumes inhaled.
2. Gastro-intestinal disturbances.
3. Ear troubles.
4. Infections of the respiratory tract.
5. Conjunctivitis.
6. Rheumatism or myalgia.
7. Burns and injuries.
8. Nervous complaints.
9. Venereal diseases.

Gasoline poisoning.—The effect of gasoline fumes inhaled, or the so-called "gasoline jag," merits a detailed description. The *D* class of submarines has gasoline engines, and the writer has seen a large number of cases of poisoning due to the inhalation of the fumes of raw or burned gasoline. The extensive use of gasoline in motor cars makes this of timely and general interest. A death due to this cause was reported in Chicago recently.

The products of combustion from a gasoline engine are methane, acetylene, and carbon monoxid. The bluish-gray smoke consists of watery vapor, soot, and grease, all of which are visible, while the invisible gases consist of nitrogen 85 per cent, carbon dioxid 4.9 per cent, oxygen 5.3 per cent, and carbon monoxid 3.7 per cent; also methane, heavy hydrocarbons, hydrogen, and aldehyd substances, the latter giving the gas its peculiar odor. Korff-Petersen in his studies on this subject found that the undiluted gas kills mice in less than one minute, under convulsions; that guinea-pigs and rabbits die in a short time when in a compartment filled with gasoline fumes, and that carbon monoxid was found in their blood. It was proven experimentally that carbon monoxid is the most dangerous constituent of these gases.

Fumes of burned gasoline may get into the boat because of a leaky valve or, as most frequently happens, when the submarines are charging batteries.

A stern breeze may blow the exhaust from the engines directly onto the bridge, down a hatch, or it may be drawn down a ventilator.

The raw or unburned gasoline may be present in the boat through leaks in the pipe lines.

Cases in which the *raw* or unburned gasoline fumes have been inhaled present symptoms of alcoholic intoxication in the stage of excitement. The onset is rather insidious, and the man passes into the stage of pleasurable excitement. He may be jocular, lacrimose, or bellicose. When in this stage of active mental excitement the man may talk in an irrational manner without any sign of incoordination or staggering. One of the 48 cases we have had at the base was working on some pipe lines to the gasoline tank. He was proceeding with his work in a quiet and efficient manner until spoken to by an officer. He jumped to his feet and began to talk incessantly and incoherently. He was immediately sent to the sick bay. His face was flushed and eyes bright; pulse rate increased, tension high. He was placed at rest in bed, given a dose of aromatic spirits of ammonia, and plenty of fresh air. His mental symptoms cleared up in about eight hours. He remembered nothing from the time he began to work on the pipe line until he woke up in the sick bay that evening.

Poisoning by the inhalation of fumes of the *burned* gasoline are more frequent and serious. As before mentioned, these fumes may be present in the engine room or blown from an exhaust ventilator to the bridge when running on the surface, or may be drawn into the boat from another boat alongside charging batteries. Cases may vary from a headache in mild cases to delirium or coma with severe constitutional symptoms, depending upon the amount of fumes inhaled and the time during which the individual has breathed the gasoline.

Following a long surface run (during which time the engines are used, whereas while running submerged the batteries are used) the men in the engine room almost invariably complain of more or less severe frontal headache. Here the fumes are not so concentrated and the symptoms are mild. If the men go on deck and take deep breaths of fresh air, the symptoms usually disappear in a short time. Weakness, languor, and headache sometimes persist for 24 hours.

One case of inhaling the engine-room fumes of burned gasoline was rather curious. An officer had been on the bridge, when the boat was under way, for about four hours, and during this time a fresh stern breeze blew the engine-room exhaust directly onto the bridge. Aside from a dull headache he experienced no unusual symptoms and gave orders clearly and sensibly. A change in course put the wind in another quarter, and the exhaust no longer annoyed those on the bridge. About two or three minutes after the fresh air hit him he suddenly was seized with dizziness, faintness, and went into a state of collapse. He was revived by usual treatment but the state of mental confusion persisted for about four hours

All but two of our cases have had subnormal temperature. One case had a temperature of 104 F. Severe convulsions lasted for almost one hour, and muscular twitchings were present for two days. Temperature became normal on the fourth day. Mental confusion lasted for three days. The other case had a temperature of 102° and thereabouts for two days, during the greater part of which time he was delirious. He had muscular twitchings and joint pains for six days. Blood pressure has been high in all cases. In all severe cases there has been a small amount of albumin in the urine, which cleared up in from one to three days.

The mental symptoms are usually headache, irritability, confusion, and delirium, sometimes coma. Mild cases have only the first two symptoms, but many cases become confused suddenly or pass into a state of coma before any other symptoms are noticed, and in this lies the danger.

The treatment of these cases is symptomatic and consists in getting the man into the fresh air. Artificial respiration is frequently necessary when a state of collapse is present.

If the patient is conscious and can swallow, a teaspoonful dose of aromatic spirit of ammonia is given. This with fresh air and rest is usually sufficient to revive the mild cases. Delirious cases have to be restrained and frequently sedatives are indicated. When coma and collapse are present, as frequently happens in the more severe cases, hypodermic stimulation, external heat, and artificial respiration are employed. The best remedy found for the headache is a capsule containing 5 grains of aspirin, 2 grains of phenacetin, and one-half a grain of caffein citrate.

Gastro-intestinal disturbances.—As in civil life, constipation is a frequent cause of illness. Confinement aboard ship, lack of exercise. and the small uncomfortable heads (toilets) are causes. The vibration of the engines causes an arrest of peristalsis, and this is also a cause of constipation.

We try to remedy this condition by getting the men to exercise as much as possible when not at work on the boats, by including as much fruit as possible in the diet, and by educating the men to come to the sick bay for a purgative if the bowels do not move at least once (and preferably twice) in 24 hours.

Ear troubles.—These consist of tinnitus, varying degrees of deafness, and impacted cerumen. The causes of the first two conditions are: (1) Changes in atmospheric pressure when compressed air is used to blow tanks when coming to the surface after a submerged run, or when compressed air is liberated from the tanks into the boat for ventilation; and (2) working for long periods of time in close proximity to noisy engines in a small compartment. The symptoms are usually relieved in a short time after the run, but occasionally the deafness in some degree persists. The wearing of some form of ear protection has been recommended and tried. It is difficult to get the men to use this protection regularly. They either lose the protector or forget to use it.

Infections of the respiratory tract.—Tonsillitis, nasopharyngitis, and bronchitis are common ailments. Pneumonia is rare, but three cases having occurred in the past two years. The causes of the first three conditions are insufficient ventilation in the submarine and "sweating." This is caused by the condensation of the moisture of the warm humid air inside the submarine on the sides of the boat, the steel plates forming the sides of the hull being chilled by the cold water outside. In the later built boats cork sheathing on the inside of the hull has eliminated this sweating and much of the dampness.

Irritating gases from the batteries and engines are also causes of inflammatory conditions of the respiratory tract. It is noticeable that on long surface runs the men who are on the bridge most of the time, where they are exposed to all sorts of weather and frequently wet with spray, do not suffer from these ailments, while those whose duties keep them below are usually affected.

Conjunctivitis.—This is frequently seen during or after a cruise. The causes are: (1) Irritation caused by gases and engine fumes; (2) wind; (3) constant and prolonged use of the eyes at the periscopes. There is congestion of the bulbar and tarsal conjunctiva, varying from a mild injection to intense inflammation, with edema. It is frequently associated with headache.

The treatment consists in removing the cause, when possible, the administration of antiseptic and mildly astringent eye baths and cold boric compresses. The wearing of goggles prevents cases due to the first two causes. Frequently errors of refraction have to be corrected.

Rheumatic affections.—Acute rheumatic fever following tonsillitis has caused a good many sick days. Many of these cases have a tendency to chronicity and only improve when assigned to other duty. Myalgia is common, the lumbar muscles being most frequently affected. The sweating in the boats previously referred to is probably one of the causes. The usual treatment is prescribed in these cases.

Burns and injuries.—Burns from battery explosions, from the sulphuric acid used in the batteries, and from accidents in the engine rooms, are of frequent occurrence. Picric-acid solution compresses, sodium-bicarbonate paste, or boric-acid ointment are applied to the smaller ones, while the larger burns are treated by immersing the injured part in a warm weak salt solution. The open-air treatment later promotes healing.

Injuries requiring minor surgical procedures are of almost daily occurrence. Occasionally major operations are required.

Nervous complaints.—These are numerous and varied. While seasickness is rare on the battleships it is not uncommon in the submarine service. It is not considered as disgraceful on a submarine as it is on a battleship. When one considers that these 300-ton boats go to sea in all kinds of weather it is not surprising that there should occur occasionally a case of seasickness. All hatches must be battened down even when running on the surface, except in the very smoothest water, and the lack of fresh air is also a causative factor. The men who can stay on deck rarely become seasick.

Nostalgia and neurasthenia are occasionally seen in men whose nervous systems are not strong enough to withstand the hardships of the arduous duty with the submarines.

The writer has seen two cases of claustrophobia in the submarine service in the past two years. In each case the man was seized with the most uncontrollable terror of the closed space when the boat was being submerged. The mental suffering and anguish of these cases is pitiable. One case which I very carefully studied recently was that of a man who had a splendid service record, had been in the Navy for over eight years, most of it on the battleships and destroyers, was an able machinist, and certainly not a physical or a moral coward. When he went out on the submarine for a dive he would begin to show signs of restlessness as soon as the boat shoved off from the dock, and as the boat began to submerge he exhibited signs of fear which he tried manfully to control. Perspiration ran from him, his pulse jumped to 150 or 160 per minute, his pupils dilated, respiration became rapid, and he became so excited and confused that not only was he not to be depended upon, but was actually a dangerous man in the boat. Once he lapsed into unconsciousness.

He was at first encouraged by mental suggestions and all hands tried to stimulate him and keep his thoughts on other things, but without result, and he would feel this terrible oppression coming over him. He could not get enough air and his "throat closed up" and his "lungs felt as if they were being squeezed in a vise." The treatment was of no avail and he was transferred from the submarine duty to a battleship, where he has been in good health. When these cases are transferred to a large ship they invariably and immediately improve.

Claustrophobia sometimes exhibits itself when men go down in a diving suit.

Venereal diseases.—Venereal diseases are rare in the submarine service. This is due to (1) the fact that the men are a specially picked lot; (2) they are mostly chief petty officers or petty officers who have been in the service for some time; (3) many of them are married; (4) a marked decrease in the amount of alcoholic liquor consumed.

If a submarine man contracts venereal infection he is taken off the submarine and kept on the tender until he is cured. Men on submarine duty get $5 additional pay per month and also $1 for each dive made up to 15 dives per month, so that it is possible for each man doing duty on a submarine to receive $20 extra pay per month. This is lost while he is under treatment on the tender and away from his boat. This is an additional incentive to the men to be virtuous and careful. Illustrated lectures on sex hygiene have been a decided factor in lessening the number of infections.

HOOKWORM INFECTION IN CUBA.

By R. Spear, Surgeon, United States Navy.

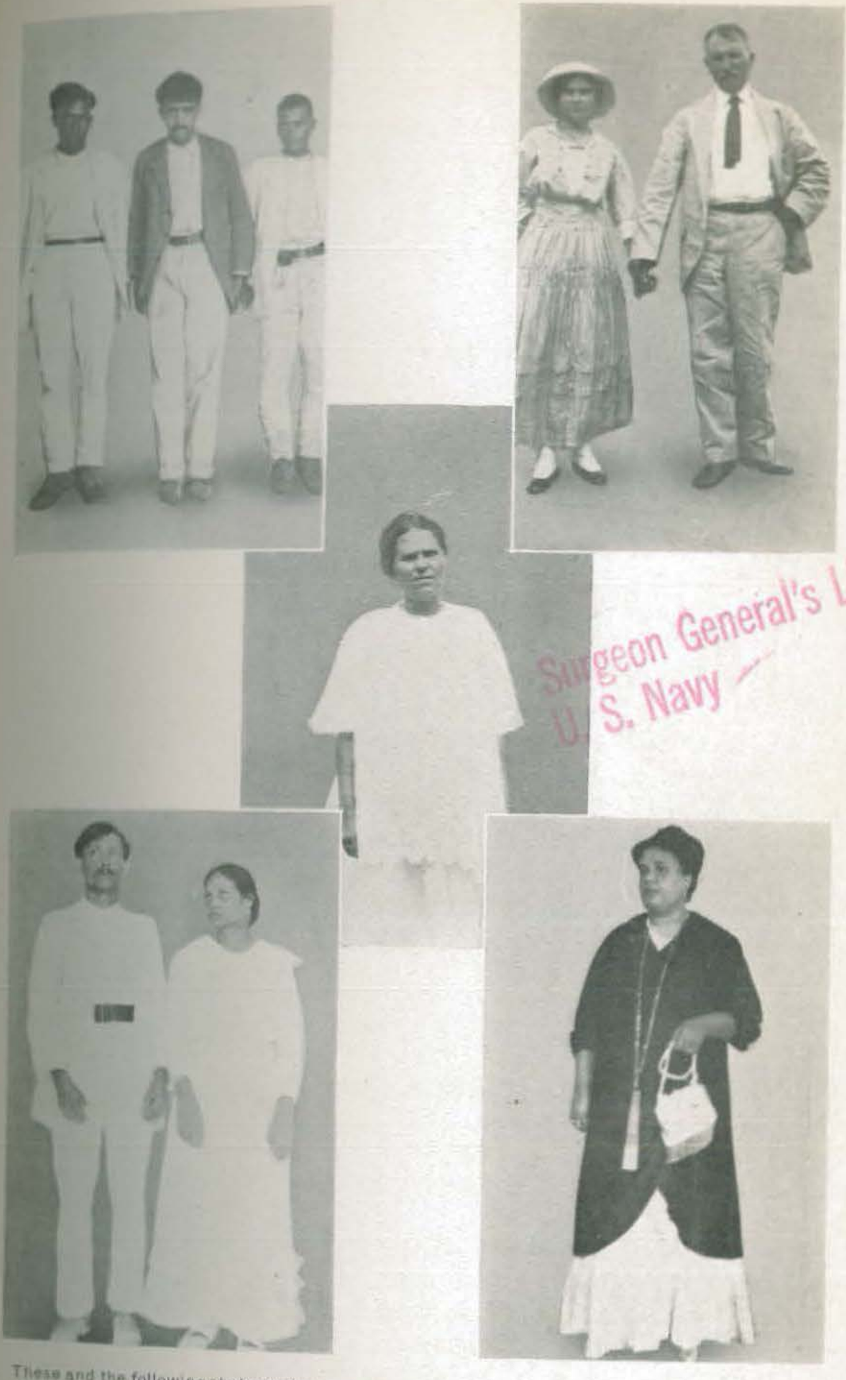
From April, 1914, to August, 1916, 2,206 specimens of feces were examined at the dispensary at the United States Naval Station, Guantanamo Bay, Cuba, as follows: Fifty-one per cent of stools were positive for hookworm; 52 per cent of stools were positive for whipworm; 20 per cent of stools were positive for roundworm; 15 per cent of stools were positive for strongyloides; and 2 per cent of stools were positive for ameba.

The specimens were collected from inhabitants of the eastern end of Cuba. A few cases came from Camaguey, which is in the central part of the island. Many cases came from the northern coast, in the region of Baracoa.

Practically speaking, the whole eastern end of Cuba is infected with hookworm, the country more so than the cities. Both varieties of hookworm are present. The ordinary Cuban that lives in the country has no idea of hygiene. There are no outhouses, feces are spread on the ground around the houses in all directions. Canvas shoes are worn, which readily collect dirt and mud and offer no protection against infection. Every Cuban house has several mongrel dogs attached to it, and they undoubtedly carry hookworms and dirt into the houses continuously. The infection is so widespread that it is remarkable that all the natives are not infected.

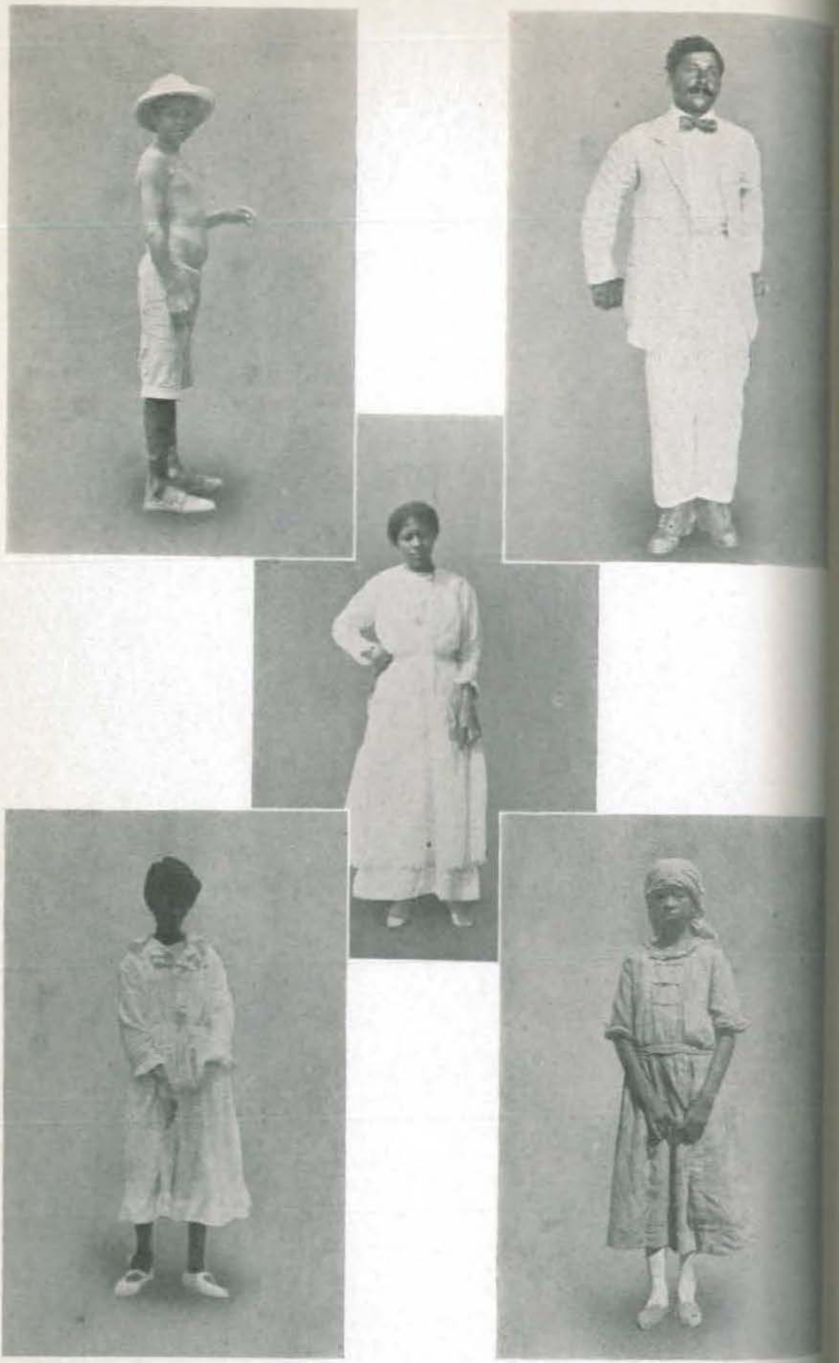
Cuba is losing the services of many men from hookworm infection who might be working. The actual loss in labor from a monetary point of view reaches into millions of dollars annually. The same conditions exist in Cuba to-day that existed in Porto Rico before the American occupation.

Examinations of the stools by Cuban doctors is a rare performance and the existence of hookworm infections is not suspected by many of the medical men. Many patients came to the naval dispensary, by horseback, from the northern coast of Cuba, a distance of 150 miles



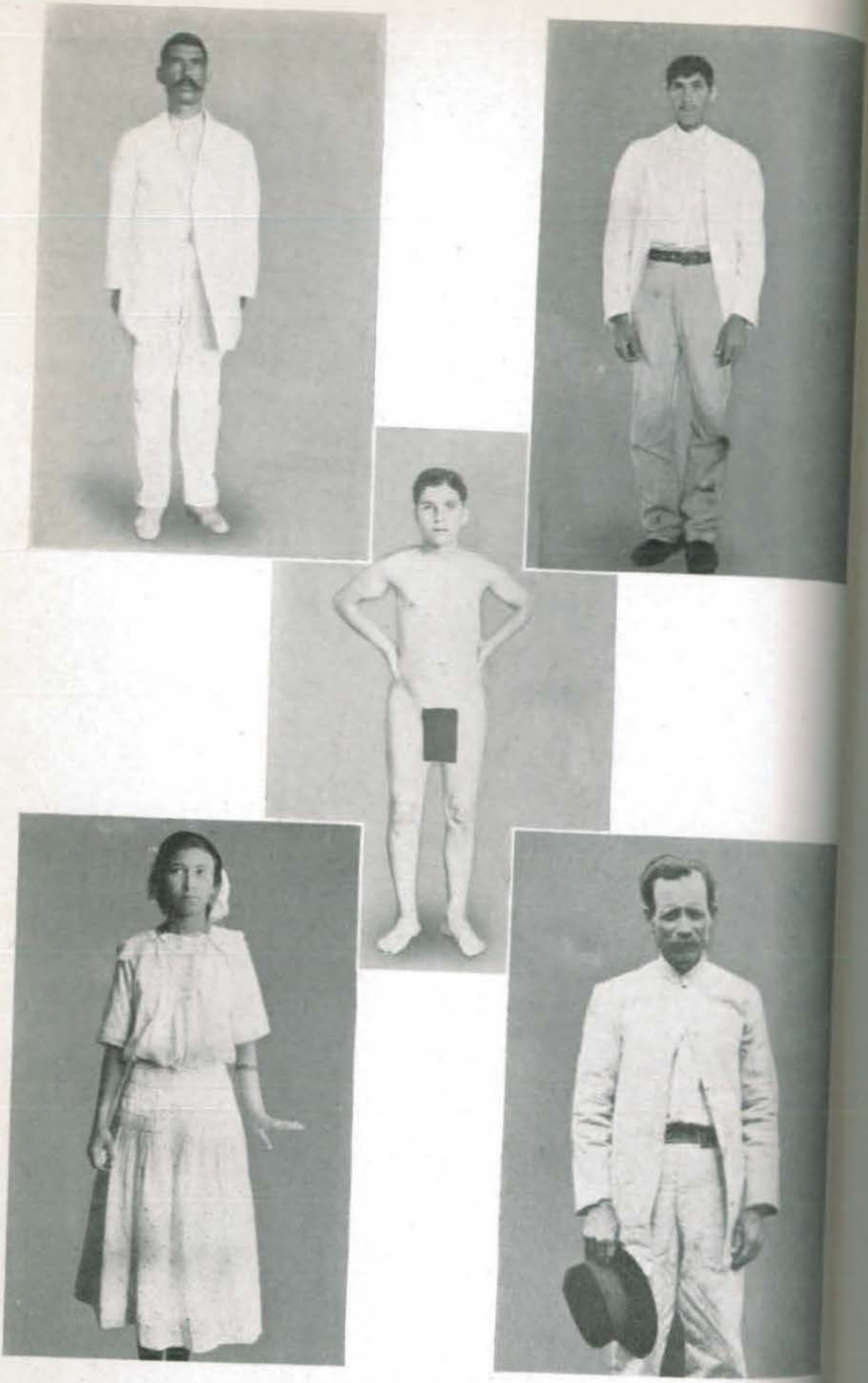
Surgeon General's Library
U. S. Navy

These and the following photographs are presented to illustrate the multiplicity of types that carry the infection, and to indicate the extreme of classes, of robustness and emaciation, of youth and age, which are met.



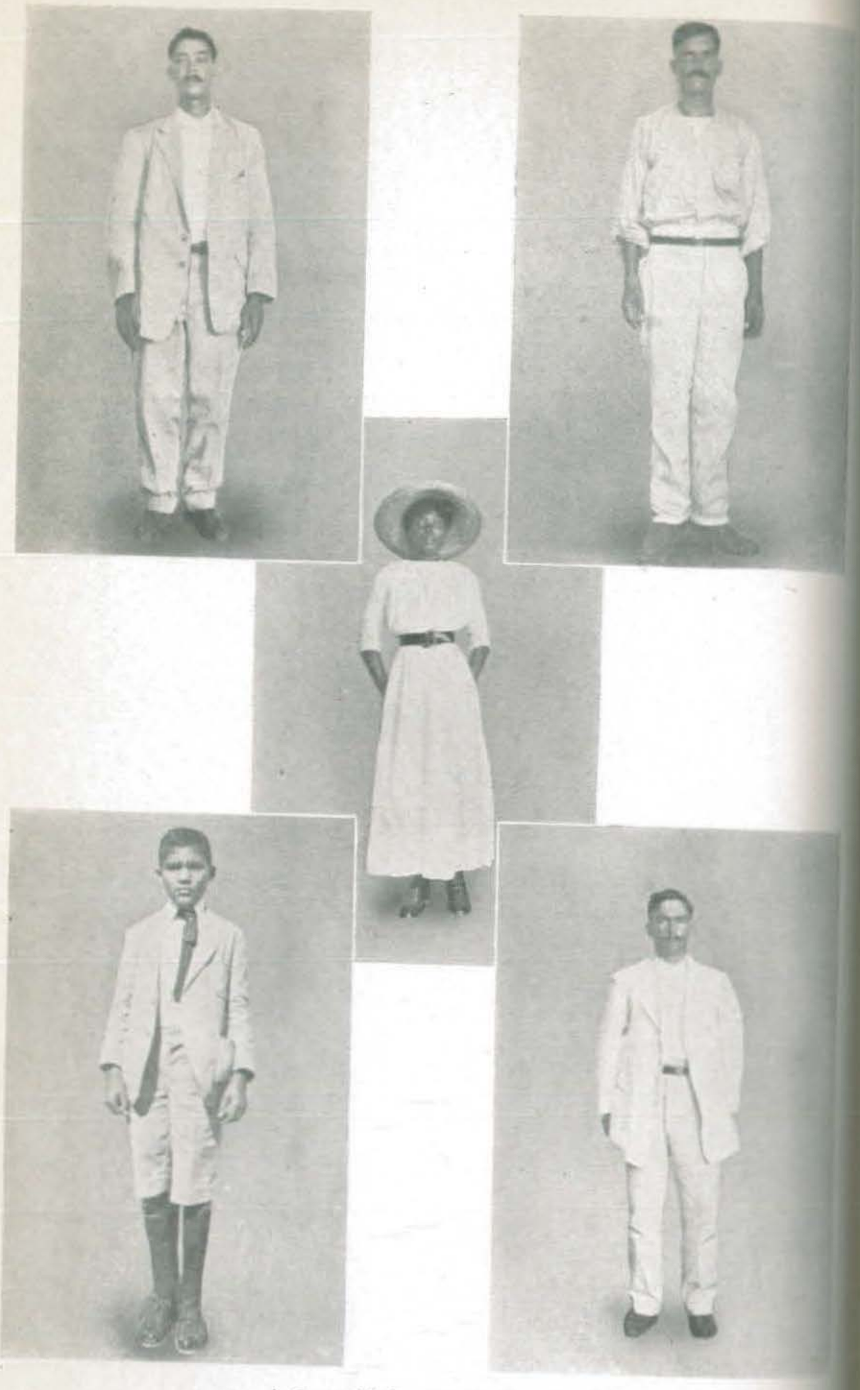
The two lower are from the case of Sydenham's chorea complicated by hookworm, referred on page 51, and represent the condition before and after treatment.

Types of infected individuals.



Types of infected individuals.

Types of infected individuals



Types of infected individuals.

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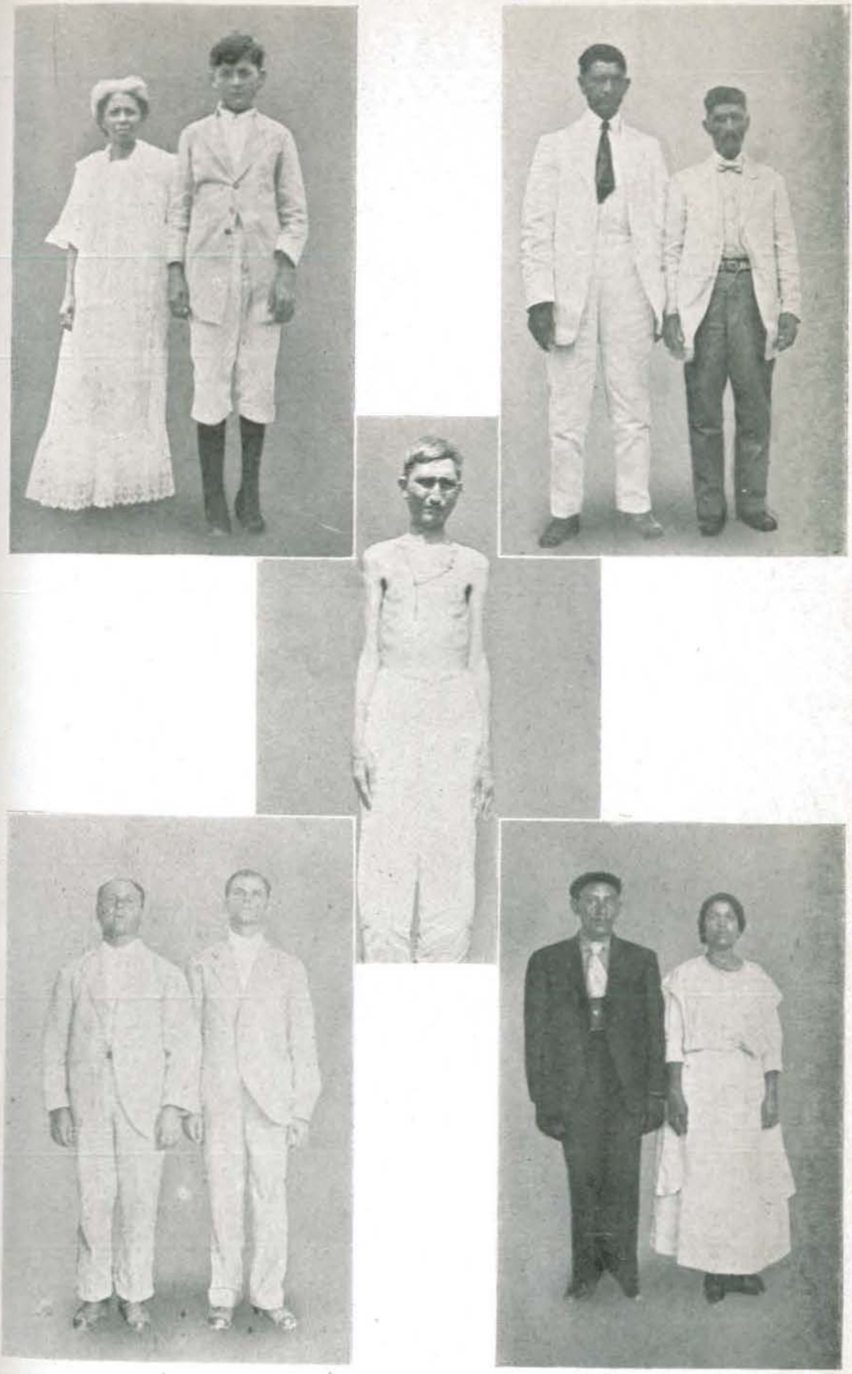

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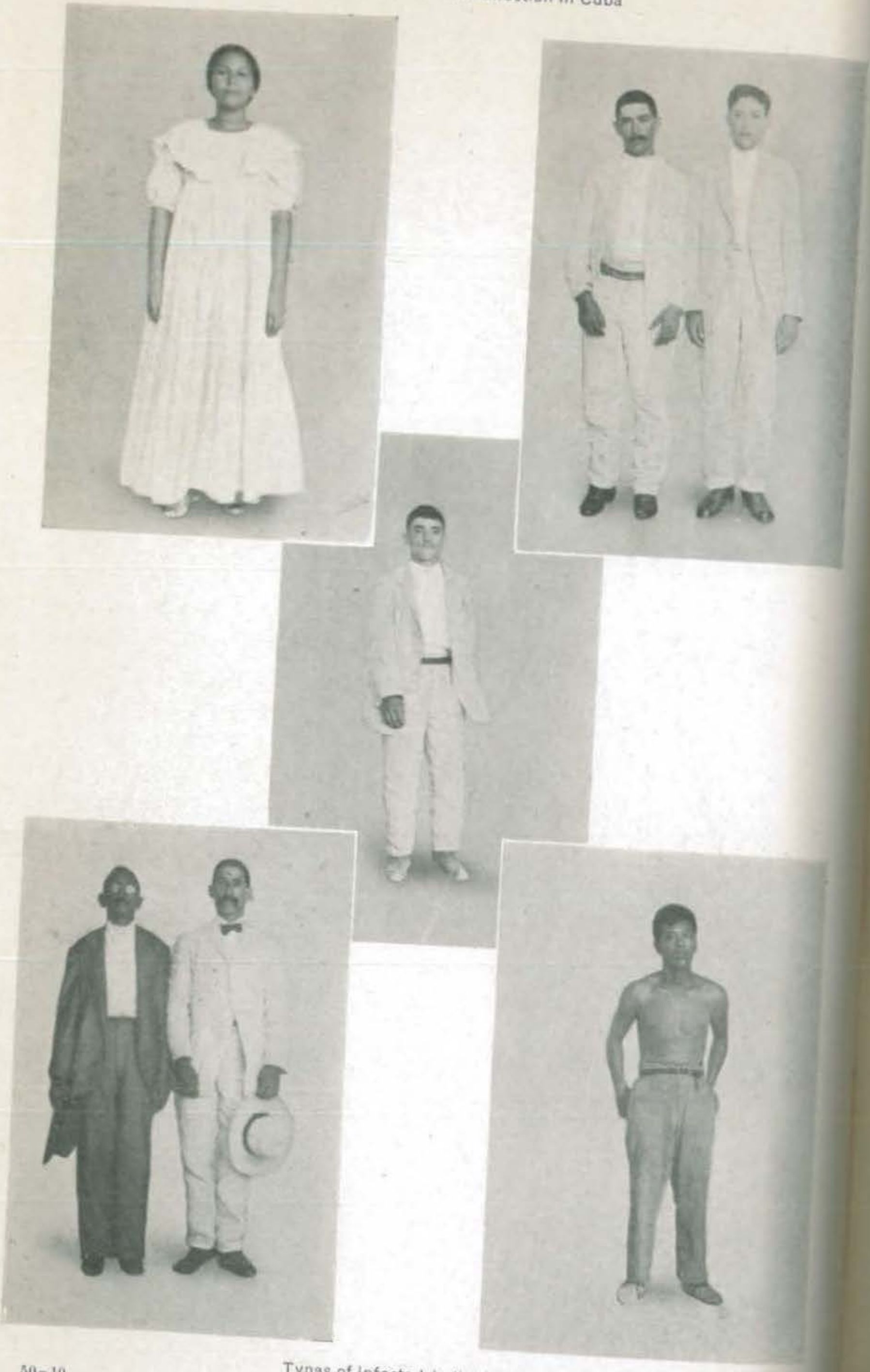


Types of infected individuals.

They made this pilgrimage not only once, but twice, and three times. After treatment and restoration to health they were walking advertisements for others to undertake the same journey. The cures in some instances were almost miraculous. Men and women who had been sick for years and who were barely able to travel, were restored to health as if by magic. Hookworm infections were found, not only in cases of poor Cubans, but also in men and women of the best classes. Prosperous sugar-cane growers and successful business men were also victims. These had in many instances consulted physicians, but had never had their stools examined. They were labeled malaria, anemia, liver disease, and whatnot, and were a source of steady income to the medical profession. Three doses of thymol usually cleared the hookworms out and cured all the other imaginary diseases.

Hookworm infections complicated many other diseases, such as malaria, tuberculosis, syphilis, and pyorrhea. Malaria and hookworm infection is a very common one. Pyorrhea and hookworm disease often go merrily along together.

It is very easy to diagnose cases of advanced hookworm infection by inspection, but it is absolutely impossible to eliminate this disease without a careful examination of the feces. Hookworm eggs are found continually when least expected. A woman will consult you about a gynecological condition and her stool will be found positive for hookworm. Operations before treatment for hookworms will not restore these cases to health. Cases of severe malarial infection can not be cured if there is a coexisting hookworm infection that has not been diagnosed. Cases of incipient tuberculosis can rarely recover if a hookworm infection is overlooked. Hookworm eggs were found in the feces of children 18 months old and were occasionally found in people 60 to 70 years of age. A history of sickness of 10 or 12 years duration was not an unusual one. Some individuals are apparently more affected than others. Oftentimes members of a family who are all infected will present very different pictures. One or two will show an advanced anemic condition and one or two others will present no symptoms and look fairly robust.

In two cases of asthma complicated by hookworm infection, thymol cured the asthma as well as the hookworm condition. One case of violent Sydenham's chorea that had existed for two months was completely cured by two administrations of thymol. This case was heavily infected by hookworms. A Cuban business man had been sick for three years and had consulted 11 different doctors in Baracoa, Guantanamo, and Santiago, and had been to several hospitals under treatment. His symptoms pointed to a duodenal ulcer. He had a history of passing blood in large quantities by his bowels on several occasions. There was a marked tenderness in the epigastric region and severe pain about two hours after eating. This man was very anemic, hemoglobin was under 40 per cent, and he had made up his mind that he was about to die unless operated upon. Examination of his stools showed a heavy hookworm infection and he was promptly restored to complete health by ridding him of his hookworms. Case after case was met where hookworm infection was the real or complicating cause of a grave disability.

The diagnosis of hookworm infection can only be made or excluded by careful microscopical examination of the feces. A rapid method of obtaining feces for examination was performed as follows: The patient was given an injection of pure glycerin, about 2 drams per rectum by means of an ordinary glass penis syringe with a hard-rubber point. The bowels moved promptly after this injection and the feces were caught in a piece of paper by the patient himself. In case the glycerin injection was not successful, which rarely happened, a second glycerin injection with about 5 drops of turpentine was given and this was almost always effective. A few drops of tap water were placed on a slide and were mixed with feces obtained by means of a match stick from different portions of the specimen. The slide was then immediately examined with a low-power (two-thirds inch) objective. The mechanical stage was used always and the light cut down. If eggs could not be found in the first slide, two other slides were examined before an expression of opinion as to the presence of hookworms was made. If for any reason hookworm disease was suspected and eggs could not be found, thymol or oil of chenopodium was prescribed, as it could do no harm and might do a lot of good. Many of the feces containing hookworm eggs also contained the ova of *Trichocephalus dispar* and *Ascaris lumbricoides*.

The symptoms presented by the hookworm cases are many and varied. The advanced cases showed fatty degeneration of the heart and kidneys with all accompanying symptoms. The anemia from the loss of blood and from the absorption of toxins produced by the worms has a very characteristic appearance. Puffiness under the eyelids—"fisheyes"—were often noticed. The hair almost always looks dry and lacks luster. The most constant symptoms complained of were epigastric distress and tenderness, with acid eructations. Pain under the right shoulder blade was noted many times. General weakness and mental hebetude were always present. It was noticed that people infected with hookworms almost always stumbled when they walked over a board placed on the floor. The coordination of the muscles was below par. Knee jerks were found to be less than normal.

The blood pressure in almost all cases of hookworm infection was found to be low. In some cases it was below 80 mgs. of mercury. Eosinophilia was almost always present.

Thymol and oil of chenopodium were the drugs used in the treatment of these cases. Three courses of finely powdered thymol in capsules (45 grains) were given in 15-grain doses, one hour apart, preceded the night before and followed in three hours by 1 ounce of magnesium sulphate. Patients were always cautioned not to take alcohol in any form, butter, milk, or fats on the day they took thymol. Oil of chenopodium was given in capsules in three doses of 16 minims each, one hour apart, and followed by castor oil. Tonics containing iron, arsenic, and strychnin were always given as a routine part of the treatment.

If the patient came from a distance and the stools could not be examined again, thymol and oil of chenopodium on alternate weeks were prescribed. Treatment was to extend over a period of from four to six weeks, according to the case.

All patients were cautioned about depositing their feces on the open ground and were told how they had become infected.

The organization of the Cuban sanitary department is very good; if the Government were to supply the necessary funds, a campaign for the riddance of hookworms from Cuba could be carried out, the same as has been done in Porto Rico.

Natives should be taught hygiene and the necessary facts about hookworm disease. They should be shown how to construct outhouses and to dispose of feces properly. This could be easily done and at the same time all medical men and *practicantes* could be instructed in the use of low-power microscopes for the detection of hookworm eggs. Most of the dogs in Cuba should be destroyed, for they undoubtedly spread hookworm disease.

When all the Cubans are freed from their hookworm infections, prosperity, health, and energy will replace poverty, sickness, and lassitude in many places, and Cuba will be rejuvenated to a great degree.

Assistant Surgeon C. R. Baker, U. S. Navy, E. Wilson, pharmacist's mate, first class, and L. J. Hollan, pharmacist's mate, second class, made many of the examinations embraced in this report.

EAR DISEASE IN THE SERVICE.

By G. B. Trible, Passed Assistant Surgeon, United States Navy.

In obtaining the histories of patients presenting themselves for ear treatment, one is constantly impressed by the idea prevalent, not only among the men but also common among the officers, that a ruptured eardrum, sustained during some target practice, was the starting point of their troubles.

The results of many examinations during a period of several years have failed to substantiate this belief, and while undoubtedly many are injured by gunfire, nevertheless under peace conditions the percentage suffering permanent ear damage is small.

When full records are received from the present combatant nations many interesting points in otology may be cleared up, particularly as to the effect of high explosives upon the internal ear. Injuries from windage, fractures of the base, rupture of the auditory nerve, concussion or commotion of the labyrinth being essentially due to war conditions, and playing but little part with us at present, will not be considered, except concussion of the labyrinth, which does occur occasionally.

There has been too great a tendency to lay everything upon the ruptured drum, overlooking the fact that the low-grade catarrhal troubles, the chronic or recurrent suppurations, old scars, atrophic areas, and the gradual deterioration and final abolition of the function of the inner ear from long-continued, excessive noise play a much more important rôle than traumatic rupture of the drum.

The origin of chronic suppurative middle-ear disease is hard to determine, especially if it is bilateral. The patient's idea of its cause, from a rupture due to gunfire, may be correct; but if it is unilateral, with the other ear showing signs of cicatrical formation, chalk deposits, or atrophy, or he presents diseased tonsils or adenoids, then the probabilities are that the condition is merely a recrudescence of an old ear disease.

Recurrent middle-ear suppuration is particularly common among the poor or those living under unhygienic surroundings, and it has been reported by Mauthner (*Zeitschrift f. Ohrenheilk*, December, 1915) from the garrison hospital No. 6 at Olmütz, that the largest number among ear, nose, and throat cases found unfit for military service were those suffering from chronic suppurative disease of the middle ear. It embraced 50 per cent of those classified as unfit, even after the discharge had ceased—the resultant impairment of hearing interferes with the patient's ability to render service except in a nonmilitary capacity.

For the year 1913 in the United States Navy there were 353 admissions and 229 readmissions with otitis media, and in 1914, when the change in nomenclature became effective, 101 admissions and 114 readmissions were recorded for acute middle-ear disease, and 210 admissions and 194 readmissions for chronic otitis media. In 1915 305 admissions and 140 readmissions were noted for the acute, and 223 admissions and 197 readmissions for the chronic. (Reports of Surgeon

General of the Navy, 1913–15.) This does not include all the damage resulting from middle-ear diseases, since a few are carried under eustachian salpingitis, or under deafness, which might have had origin in the middle ear. Neither are the complications such as mastoiditis embraced in these figures.

Distinction has not been made in these reports between suppurative and catarrhal affections of the middle ear, but ordinarily those suffering from the nonsuppurative variety do not seek relief until defective hearing has become apparent either to the patient or his shipmates. The exception to this is at the Naval Academy, where the great majority are catarrhal affections. The suppurative cases are rejected upon the examination for entrance or at some subsequent yearly examination.

Otitis interna, in its various phases, causes but few admissions. Many middle-ear cases later show internal ear complications, and others are carried under deafness, or in the event of their having been caused by some infectious disease are carried under that heading.

A condition frequently seen in the Navy, but to a less degree in civil practice, is a virulent external otitis, which macerates and frequently perforates the membrana tympani. No constant organism is found; quite often these cases occur after swimming or diving in tropical waters, and in patients debilitated from any cause. The swelling of the external auditory canal and consequent interference with drainage renders treatment difficult.

The normal drum is very resistant to pressure, and it has been shown experimentally, on the cadaver, that it can withstand sudden increases in atmospheric density up to 4 or 5 atmospheres (60 to 75 pounds), whether applied through the eustachian tube or through the external auditory canal (Gruber, *Lehrbuch der Ohrenheilkunde*, p. 319). Stoppage of the tube tends to aid rupture, as well as weakness of the drum from former disease. Even after rupture by gunfire the process of repair is very rapid unless complicated by infection, although the disturbances due to concussion of the labyrinth persist for a much longer period. According to Politzer, concussion of the labyrinth may occur through an intact drum, the air waves driving the foot piece of the stapes in the oval window with great violence.

Records show 10 cases of ruptured drum in the North Atlantic Fleet as result of gunfire from April to August, 1898, while in the Japanese fleet, at the battle of the Yalu, 19 cases were found (Barnhill and Wales' Modern Otology, p. 234).

The annual report of the Surgeon General for 1914 gives seven admissions for ruptured tympani from explosives and gunfire and six readmissions, with seven cases admitted in 1915 (letters E and

F). A smaller number was admitted for rupture from athletics and unclassified causes.

During the recent winter target practice at Guantanamo one case was referred for examination on this ship, and while others probably existed, they must have been few, since inquiry from several medical officers failed to disclose their presence.

As an example of a severe case of this type the following, that of a yard workman on the *E-2*, injured during the explosion on board that vessel at the New York yard, is worthy of note.

Case.—H. R. R. Yard workman. Inasmuch as this case is of extreme interest in many respects, a fairly complete history and description will be given.

Previous history (with possible bearing on ear conditions): No previous ear disease; had measles in childhood, no complications; four years' naval service as plumber and fitter (1909–1913).

History of present condition: Was working in the engine room of the *E-2*, January 15, 1916, when there occurred an explosion at about 1.05 p. m. Remembered crawling around, then some one picked him up and pulled him out. Sustained burns on the head, face, around ears, on the feet, ankles, and chest. He was taken to the Cumberland Street Hospital, remained there about a month, and was discharged home. He remained from work until May 1, 1916. Ears discharged from time of explosion until recently (May 15, 1916). He was treated for the ear trouble at the Brooklyn Eye and Ear Hospital.

Present condition: Hearing, watch on contact; tuning-fork tests—Weber lateralized to right; Rinné BC greater than AC; Schwabach possibly a trifle shortened. Acoumeter about 5 feet each ear. Galton—can not hear very high end of scale. Air conduction—no forks heard below C^1 256 d. v. Spoken voice almost one-third off. Whispered voice 3 to 5 feet.

Otoscopic examination: Right ear about three-fourths of the drum missing; Shrapnell's membrane remains and a small portion of the drum, the malleus directed backward and adherent to the promontory; recess of the round window visible, as is also opening of the eustachian tube; inner wall of the tympanic cavity honeycombed in appearance.

Left ear about the same amount of drum and scar tissue, but the attic can be brought into view, and the portion of the incus near the malleus can be seen. Inner wall of the cavity is smooth and not honeycombed.

Subjective symptoms: Some dizziness and defective hearing. Prognosis: The hearing will decrease in all probability, and repeated attacks of suppurative disease may occur. There is, however, a possibility that the drum may be reformed by scar tissue, and in that case protection will be afforded to the middle-ear cavity.

This is an extreme case, complicated by serious burns and severely infected, and yet upon examination several months later considerable hearing power is found present. Such extensive destruction is rare; usually there is a simple linear tear, often situated in the post-inferior quadrant, or extending downward from the tip of the long process of the malleus. Politzer states that the injuries from explosives are usually in the anterior half. Shrapnell's membrane is rarely affected. Rarefactions following explosions are probably less often the cause of ruptures.

Examinations made at the Naval Academy extending over three months and including about 300 midshipmen showed a very little inner-ear trouble; no injuries were found after artillery practice. Two traumatic ruptures were seen; one, infected, caused by a kick in the water close to the patient's head, driving the water into his ear, and the other, noninfected, was a simple linear tear extending downward and slightly backward from the tip of the long process. The second was the result of a blow on the ear during a football game, and healed slowly, later reopened along the same line following a slap received while boxing, but finally healed completely.

A cause of low-grade ear disease and consequent deafness, much slower and more insidous in its progress, but just as important in its final outcome, is the constant noise incident to ship life.

Ballinger says: "Those engaged in certain occupations, where continuous or frequently recurring sounds are heard, are apt to suffer more or less deafness.

"The terminal nerve filaments of the labyrinth are constantly subjected to irritation, and to a degree undergo degenerative changes, often going to complete atrophy and consequent deafness."

This form of deafness has been observed among blacksmiths, telephone operators, boiler makers, and machine-shop employees in general.

That these conditions prevail on board ship is evident, and an examination of a number of enlisted men, selecting those who have been in the service over two enlistments, will show a remarkable drop in the hearing power, even without the history of previous disease, and presenting a perfectly normal drum. The existence of a complicating catarrhal middle-ear disease intensifies all the ill effects.

These conditions of ship life can not be altered to any appreciable degree, but a more careful selection of personnel will minimize the evil results.

In the case of officers commencing their career as midshipmen, expecting to continue throughout the various grades up to command rank, careful selection is paramount. Normal hearing and a normal drum should be the standard.

Deterioration in hearing, in the case of sound ears, will ensue merely as a result of service conditions. This is doubly so in the cases of those handicapped by ear disease.

THE TREATMENT OF GASTRIC ULCER.

By W. A. BRAMS, Assistant Surgeon, United States Navy.

The treatment of gastric ulcer consists in effecting such conditions within the stomach as will result in a spontaneous healing of the lesion.

The following requirements must be met to accomplish this:

1. Protection of ulcerated surface from chemical and mechanical irritation, thereby rendering digestive ferments inert and stopping autodigestion, as free HCl is necessary for both in their action. The chemical irritation is removed by neutralizing and reducing the production of the HCl.
2. Relief of symptoms.
3. Removal of products of irritation.
4. Prevention of complications.

Spontaneous healing can occur only when these conditions are fulfilled. This is essentially the kind of cure that medical treatment can accomplish.

Surgical interference fulfills these same conditions but in a different manner. Excision of the ulcer is the only direct surgical means of treating the diseased area. Surgery—that is gastro-enterostomy—relieves the condition by means of drainage, whereas medical treatment aims to accomplish the same end by chemical means, diet, and rest.

It is obvious that the choice between medical and surgical procedures depends upon—

(1) The condition of the patient; 2) the duration and obstinacy of the disease; and (3) the operative skill available.

Many noted surgeons give the following reasons for surgical treatment in the cases of gastric ulcer:

Gastric ulcer, with organic strictures, either actual or potential, responds to surgical treatment in 98 per cent of cases. The mortality is 2.4 per cent (Mayo).

Indurated gastric ulcer degenerates into carcinoma in 40 per cent of cases (Mayo).

Medically treated gastric ulcers, operated during the quiescent stage, showed an unhealed surface and no cicatrix in several cases (Mayo).

The course and final outcome is unknown, and when a diagnosis of malignancy is made the treatment is futile.

The internist gives the following reasons for a thorough medical treatment, advising surgery in complications and obstinate cases only:

Medical cures are attained in 97 per cent of cases.

Surgeons see only the chronic and obstinate cases.

Medical men state that ulcer undergoes a malignant change in only 7 per cent to 15 per cent of all cases.

Nonindurated ulcers, involving the mucosa only, may be treated successfully by medical means (Mayo).

Simple gastro-enterostomy does not afford protection to the ulcerated surface, and the condition is essentially the same as that exising in a nonobstructed ulcer.

Roentgen-ray examination after a gastro-enterostomy shows that the gastric contents still pass through the pylorus and that a smaller amount goes through the artificial opening. Hence the benefit derived from this operation can not be properly attributed to drainage or other supposed mechanical results of the artificial opening.

From the foregoing it appears that the middle course is the better. The following rules may be profitably observed:

At first, all cases should be treated medically over a sufficient length of time, say from four to five weeks. Then should neither a cure nor a marked relief be effected surgical interference is indicated.

Recurrences which are not easily alleviated, say in from three to five days, and with an ordinary diet, should receive operative attention.

All other cases should be treated by surgery. A gastro-enterostomy plus excision should be performed wherever possible.

It is needless to say that complications call for operative intervention. Such complications are: (a) Gastric or pyloric stenosis; (b) profuse or repeated hemorrhage, sapping the strength of the patient; (c) hourglass stomach; (d) perigastric adhesions; (e) suspected malignancy or tumor; (f) obstinate cases with severe pains or hypersecretion; (g) perforations.

Unless elaborate and proper nursing can be afforded at home the treatment should be conducted at a hospital or sanitarium. Three general types of treatment are known. They are:

1. The starvation method.
2. The light-feeding method.
3. The full-diet method.

Each has its proper place. The first should be employed where radical treatment is necessary. It will seldom be required if the second method is carried out conscientiously. The second is the preferable method. The third is adapted to milder cases. Before commencing definite treatment a proper understanding of the condition must be obtained. The following points must be determined, as the type of treatment will depend on the presence or absence of them. These points are: Duration of the ulcer, degree of involvement, and probable complication.

Rosenow thinks that the etiology of gastric ulcer is a hematogenous streptococcic invasion of the mucosa from some focus of infection in the body. The resulting slight injury is aggravated by the corroding gastric juice. Further autodigestion occurs when the free HCl permeates the ulcer area and actuates the pepsin both in the glands and on the surface of the injured area. Combined acids do not have this property. From this it may be advisable to seek a focus of infection and remove it as a further preventive as well as a means of cure.

Rest in bed.—Complete mental and physical rest for a period of three or four weeks is absolutely essential. Bodily massage, except of the abdomen, every morning. Sponge bath, alcohol rub, and proper attention to ventilation and light. The patient may sit up for 30 minutes every day thereafter, and he should not engage in work for at least eight weeks.

Diet.—In a very irritative case, absolute starvation should be enforced for about three days. No nourishment by mouth should be permitted. Small chips of ice may be held in the mouth, and normal saline solution per rectum, about 4 ounces every four hours, may be given. Opiates may be employed to quiet the pain, thirst, and the gastric contractions causing the sensation of hunger. For this purpose morphin, one-fourth grain hypodermically, and a suppository containing one-half grain of morphin should be used. Frequently, however, this initial starving is not necessary. The diet begins as follows:

Milk and cream, 1 ounce of each, given every hour from 8 a. m. to 8 p. m. This is continued for the first three days. Through this feeding there is constantly present in the stomach a small amount of food which will take up the free acid. The milk and cream are highly nourishing and do not materially increase the secretion of gastric juice or HCl. The milk and cream treatment is continued for several months.

Soft-boiled eggs and well-cooked cereals may be added to the routine milk-and-cream diet if the case progresses satisfactorily. One soft-boiled egg may be added in the milk on the fourth day. About 3 ounces of well-cooked cereal may be given in the milk on the fifth day instead of the egg. On the sixth day the patient may have 1 soft-boiled egg in the morning and 3 ounces of cereal at noon. On the seventh day he may have 1 soft-boiled egg at 8 a. m., 3 ounces of cereal at noon, and another egg at 6 p. m. On the eighth day 1 egg at 8 a. m., cereal at noon, egg and cereal at 6 p. m. On the ninth day he may have one egg at 8 a. m., egg and cereal at noon, and egg and cereal at 6 p. m. On the tenth day the patient is allowed 1 egg and 3 ounces of cereal at 8 a. m. noon, and 6 p. m. The milk and cream is continued during the above period. Rice, oatmeal, farina, and cream of wheat may be used.

After the tenth day, if the patient has no marked symptoms, cream soups and vegetable purées may be substituted at intervals for the cereal and egg, but the total volume at one feeding should never exceed 6 ounces. Individual pecularities may be met by using grape juice, cocoa, or other flavors with the milk and cream. The white of an egg and frozen butter balls may be substituted for the milk and cream meals. Cream soup may also be substituted for milk and cream even in the early days of the treatment. The patient may gain 3 pounds a week on this diet with rest in bed. The patient should be weighed regularly. In the third or fourth week such delicacies as stewed fruits, creams, custards, marmalades, and jellies may be added; but meat should be withheld, especially at a time when the stools are being examined for blood. After the fourth week, if no symptoms are present, such meats as tender beef, mutton, or chicken may be added. The interval between feedings may now be gradually increased so that the meals will be two hours apart in the fifth week. The feedings may be brought up to 8 ounces and the milk and cream to 2½ ounces of each. After the sixth or seventh week the interval between feedings may be lengthened to three hours, with a corresponding increase in volume of meals and dose of alkali. Five feedings a day should be kept up for several months. The diet for one year should consist of milk, cream, cereals, soft eggs, vegetable purées, cream soups, bread and butter, chicken, fish, and other light meats. A cure is not effected until the patient is free from symptoms on a full and regular diet for six months.

Alkalis.—A teaspoonful of bismuth subnitrate should be taken a half hour before each first morning meal. Each of the following powders is taken alternately every two hours, so that one is taken every hour: (a) Sodium bicarbonate; heavy calcined magnesia; *aa* gr. x.

This powder is taken in 1 ounce of water. Begin one-half hour after the first morning meal and alternate with the following powder: (b) Bismuth subnitrate, gr. x; sodium bicarbonate, gr. xxx.

This powder is also taken in 1 ounce of water every two hours. Begin one-half hour after second meal. Larger doses may be required in cases of stagnation of two or more months' duration. The powders should be taken until 10 p. m. In this way any free HCl or other acid will be promptly neutralized. The powders should be given midway between meals when the interval is lengthened, but in proportionally larger doses. The morning teaspoonful dose of bismuth is continued for about two months, the other powders for several months, with an occasional interval of 10 days' exemption.

Of course, the diet and alkali used will depend upon the patient. The ideal amount of alkali has been taken when gastric contents are neutral in reaction after food is taken and just prior to the subsequent alkaline dose; provided there is no hypersecretion. The bismuth-soda bicarbonate powder constipates; the magnesia-soda bicarbonate powder is a laxative. By substitution of the one for the other the bowels may be regulated as is necessary.

Lavage.—Lavage should be performed at the end of the first day of starvation to determine if hypersecretion is present. If not present it is unlikely that it will appear later; only a distinct contraindication to the stomach tube should prevent this routine measure. In cases of obstruction or marked hypersecretion, lavage should be performed at 10.30 p. m., and at intervals of 10 to 12 hours thereafter. The condition will usually abate after the second or third washing, but if it persists for three days begin feeding in the regular manner, as food sometimes alleviates the condition. If hypersecretion disappears in 48 hours, commence the starvation treatment again; if not, lavage is practiced two hours after the last meal for one or two weeks as a routine measure.

An arbitrary test for an anatomical stricture of the pylorus with a marked closure, after about two weeks of treatment, is the recovery of 100 mils of gastric contents, seven hours after a motor test meal has been taken. Strictures are benefited frequently by thorough medical treatment. The spasmodic variety disappears when the inflammation and irritation have been eradicated. Even many cases of anatomic stricture improve and undergo a physiological recovery when, after medical treatment, the edema and swelling are reduced. The stomach is like the heart when stenosis obtains. If an incomplete stenosis occurs, the gastric musculature will hypertrophy and compensate for the abnormality, thereby forcing sufficient food through the stricture, and a physiological recovery takes place.

The following symptomatic treatment should be instituted: For constipation, Carlsbad salts in warm water in the morning or an enema; for discomfort, warm compresses over the abdomen.

The stools should be examined every morning for occult blood until it is made absent for two consecutive weeks. Thereafter the test should be made once a week if no symptoms are present and the case is improving. At regular intervals the gastric contents should be examined for blood.

Persistent pain may be due to:

1. Colonic irritation, which is recognized by the presence of diarrhea and the effect of a hot enema.
2. Threatening perforation, which is recognized by continuous pain, tenderness, fever, leukocytosis, and painful breathing.
3. Malignancy, which is recognized by persistent bleeding and the fact that the pain is not influenced by food, alkali, or lavage.
4. Hypersecretion, which is recognized by pain occurring at 2 or 3 a. m., evidence of pyloric stenosis, and the recovery of much gastric juice in from 7 to 10 hours after a meal.

The following treatment is recommended for hemorrhage: Absolute rest in bed; absolute starvation; elevation of the foot of the bed; ice bags over the epigastrium; morphin hypodermically; opium suppository; and if required normal saline solution, 4 ounces, every four hours per rectum. Other measures are the injection of serum, about 20 mils, hypodermically, and a 10 per cent gelatine solution per mouth, about half an ounce three times a day. When these measures fail, lavage with ice water, to which adrenalin is added, about 1 mil to 50 of water. From 1 to 200 mils are introduced at one time, and this measure is repeated until the bleeding stops. Operation should be performed in persistent bleeding before the hemoglobin falls below 40 per cent. In very severe cases with weak pulse and little resistance, do not operate. Some of these cases recover spontaneously, and the shock of an operation may prove fatal.

For spasm give adrenalin, 1 mil, hypodermically; atropin, one one-hundredth grain; warm poultices, and if necessary feeding by the duodenal tube.

Surgical treatment.—Gastro-enterostomy, plus excision, or infolding, should be practised. Mayo uses chromic catgut, continuous suture for the mucosa, and interrupted silk suture for the outer coat. This prevents any adhesions or ulcerations at the suture line which may cause a recurrence. The indurated ulcers develop into carcinoma in 40 to 50 per cent of cases, hence the results are far better when treated surgically.

The treatment outlined above must be enforced rigorously. All cases except those with very serious complications requiring operation, as noted before, respond to medical treatment in nearly every instance. The failures are due chiefly to laxity and indifference to details. Gastric ulcer is the most satisfactory gross lesion for the medical man to treat, and if the treatment is properly carried out, not more than 3 per cent of cases need go to the surgeon.

A PRELIMINARY REPORT ON THE PATHOLOGY OF NARCOTIC ADDICTION.

By C. F. Stokes, Medical Director, United States Navy.

The grave and growing menace to the health, morals, and safety of the Nation through addiction to opium and its derivatives, particularly to heroin, has led the writer carefully to investigate the pathology of narcotic addiction. With the courteous permission of the Surgeon General of the Navy, a brief preliminary report is presented.

From careful clinical studies of 500 narcotic addicts, over 90 per cent of whom were heroin sniffers, the writer has arrived at the following conclusions:

That opium and its derivatives depress the brain link in the kinetic system of Crile, involving the other organs of that system secondarily; that withdrawal of the drug of addiction brings about manifestations directly traceable to varying degrees of overactivation by the brain of the adrenals and other organs of the kinetic system.

The laboratory observations of Crile directed along other lines of investigation strongly confirm these clinical findings. Through the courteous cooperation of Dr. Crile and his laboratory staff, investigations bearing directly upon narcotic addiction are being made, and when concluded will be incorporated with the completed report of this study.

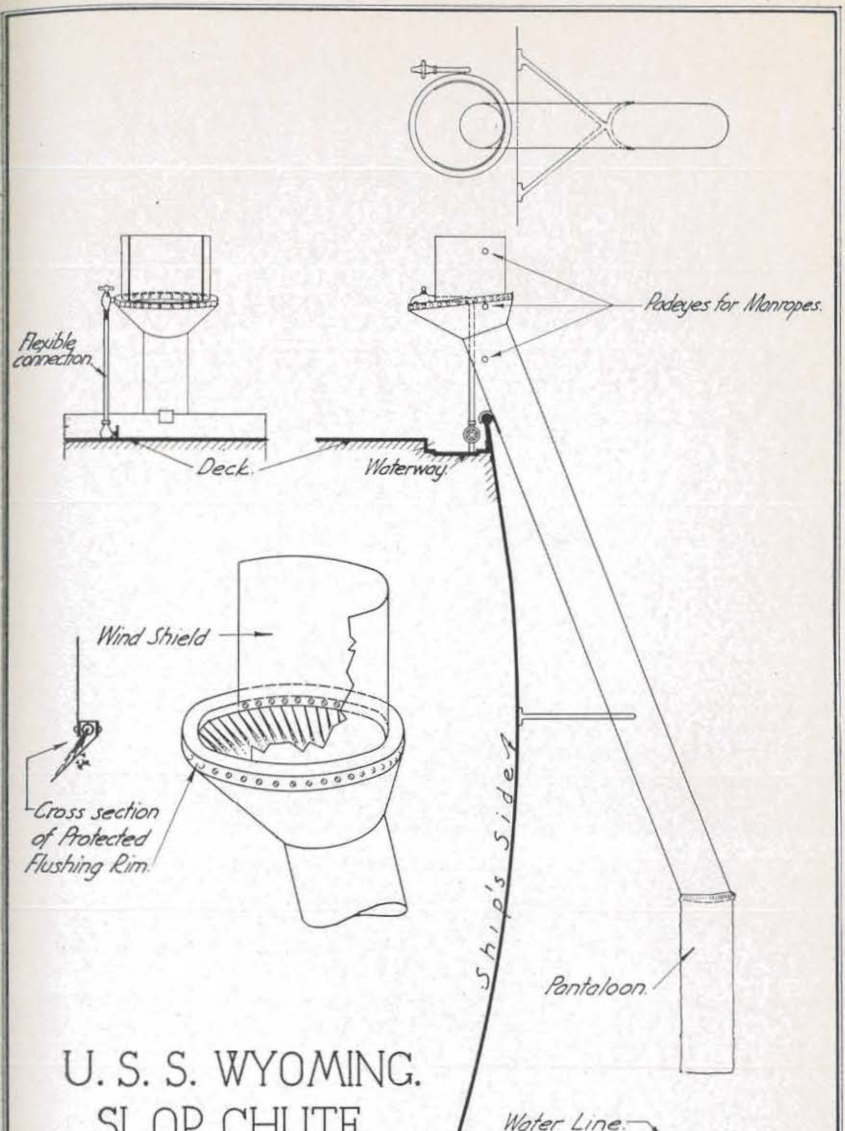
UNITED STATES NAVAL MEDICAL SCHOOL LABORATORIES.

Additions to the pathological collection, United States Naval Medical School, October to December, 1916.

Accession No.	Tissue.	Diagnosis.	Collected by or received from—
1166	Colon	Carcinoma	Surg. U. R. Webb.
1167	Heart	Endocarditis	Passed Asst. Surg. R. G. Davis.
1168	Blood smear	Malaria	Asst. Surg. C. R. Baker.
1169	do	do	Surg. W. B. Grove.
1170	do	do	Passed Asst. Surg. M. E. Higgins.
1171	do	do	Naval Station, Guantanamo, Cuba.

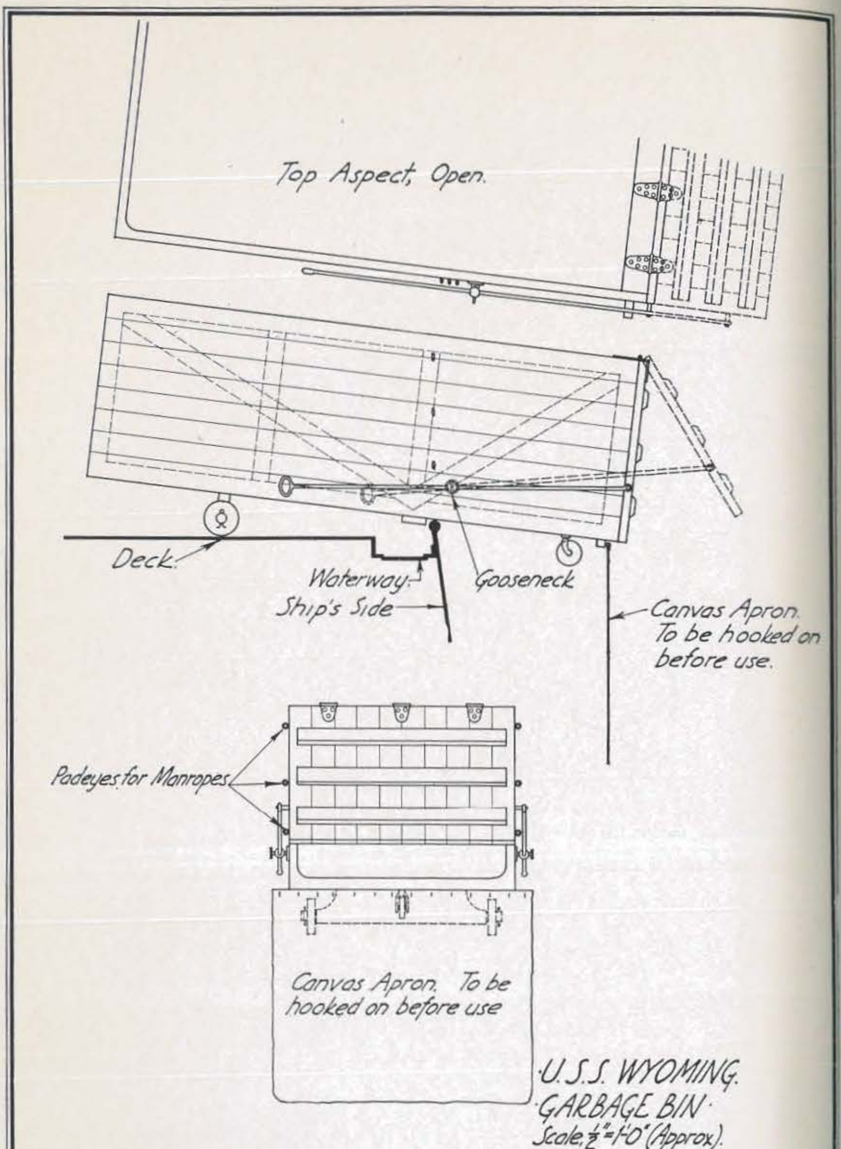
Additions to the helminthological collection, United States Naval Medical School, October to December, 1916.

Accession No.	Parasite.	Host.	Collected by or received from—
19925	Ova of various intestinal parasites.	Homo	Asst. Surg. J. Harper.



The chute should be galvanized iron pipe and may be of any length desired. The funnel should be strong and of brass so that it can be kept in good condition. The wind shield should also be of brass.

Bell—Garbage Bin.


Top Aspect; Open.
Deck.
Waterway.
Ship's Side
Gooseneck
Canvas Apron. To be hooked on before use.
Padeyes for Manropes
Canvas Apron. To be hooked on before use
U.S.S. WYOMING.
GARBAGE BIN.
Scale, ½"=1'-0" (Approx).

The bin should be strongly made of tongued and grooved material, with no open cracks, corners curved, lined with porcelain or copper with smooth seams. Lining should extend over top of ends and sides to outer edge.

SUGGESTED DEVICES.

SLOP CHUTE AND GARBAGE BIN FOR BATTLESHIPS.

By W. H. BELL, Surgeon, United States Navy.

The sanitary handling of waste from the galleys, pantries, and messes (slops and garbage) aboard ships without incinerators is a problem which the devices illustrated in the accompanying sketches attempt to solve. The slop chute can be kept rigged and used at all time for the disposal of liquid waste, and when at sea or in ports which permit the discharge of garbage overboard for solid waste also. The garbage bin is devised to hold at least a 24-hour accumulation of garbage on a ship of the size of the *Wyoming*, pending its discharge into a lighter provided for the purpose. Both chute and bin are designed to be durable and sanitary, offering no cracks or ledges or imperfect unions where particles of waste can catch, and are easily cleanable.

The chute head is designed to be constructed so that it can be taken apart and repaired or cleaned. The wind shield is to prevent the slops from being blown on the deck. The water connection is to be made with the flushing system and serves the double purpose of furnishing a continuous flush for the chute from the circular pipe in the chute head and a source of rinsing water from the faucet at the side of the chute head. The pantaloon on the chute and the apron on the bin are to prevent the soiling of the ship's side. The door of the garbage bin can be opened or closed and secured in either position from the deck by a gooseneck. The wheels are to facilitate the moving of the bin from or to a midship stowing space when it is shipped or unshipped.

PROGRESS IN MEDICAL SCIENCES.

GENERAL MEDICINE.

E. THOMPSON and J. A. RANDALL, Surgeons, United States Navy.

ROSENBLOOM, J. **The Bastedo sign in chronic appendicitis.** Surg., Gynec., and Obst., xxiii, No. 5, November, 1916.

This sign consists in finding pain and tenderness to finger-point pressure at McBurney's point after inflating colon with air through a colon tube injected 11 or 12 inches into the rectum.

The author has found the test infallible in 14 cases of chronic appendicitis (confirmed by operation) out of 40 cases in which further diagnostic criteria were desired.—(C. N. FISKE.)

LUTTINGER, P. **The epidemiology of pertussis.** Am. Jour. Dis. Child., September, 1916.

From a study of 10,512 cases the author has made certain observations which he summarized as follows.

Epidemiologic studies in whooping cough conducted by the research laboratory shows that pertussis is a very prevalent disease in New York City, and that probably only a tenth of all cases are reported to the department of health.

About 80 per cent of all cases and 97 per cent of all deaths are in children under 5 years of age. Fifty per cent of the cases are in those under 2 years of age, and over 50 per cent of all deaths are in children under 1 year of age.

The incidence of pertussis among girls, as well as the number of deaths, is constantly higher than among boys, the proportion of both morbidity and mortality being about 44 per cent for boys and 56 per cent for girls.

In contradistinction to other respiratory diseases, whooping cough seems to be most prevalent in the spring and summer months and the mortality curve reaches its highest point in August, showing a similarity to the diarrheal diseases, although most deaths are due to pertussis pneumonia.

Poor surroundings, congestion, lack of fresh air and proper care, due to the guardian's precarious economic status, seem to have a determining effect on both the morbidity and mortality of pertussis.

The actual case mortality in whooping cough is difficult to estimate, owing to incomplete returns; it is probably about 1 per cent.

The death rate per 100,000 population is about 7. It has been steadily decreasing for the last 50 years, having been as high as 58.82 in 1872 and as low as 4.71 in 1908.

Whooping cough is transmitted by direct contact and in nearly 60 per cent of cases the source of infection is given as coming from a neighbor. Relatives and friends, schools, nurseries, recreation piers, and ferries are other sources of infection. Moving-picture shows and public conveyances seem to be important factors in the dissemination of the disease.

Adult pertussis carriers probably have been disseminating the disease and have remained unrecognized owing to the atypical form in which it manifests itself.

Pertussis vaccines, as prepared by the bureau of laboratories, when given early, have continued to give good curative and prophylactic results at the whooping-cough clinic and in the hands of a large number of private practitioners and health officers. The very small number of deaths under vaccine treatment and the vast crowds who apply for treatment at the clinic indicate a favorable and possibly tangible influence of the specific treatment on the further epidemiology of the disease.

Measures should be adopted to reduce the morbidity and mortality of pertussis, special attention being paid to children under 1 year of age in the spring and summer months. These measures should include the following:

1. Education of the private physician as to the prevalence and fatality of the disease and the securing of his cooperation in reporting all pertussis cases and in using the specific vaccines wherever practicable as a prophylactic and in early cases.
2. The education of the laity through physicians, nurses, leaflets, etc.
3. Regulation of moving-picture shows and other public-meeting places, which should, as far as possible, exclude children with paroxysmal coughs.
4. Quarantine of pertussis cases during the first two weeks of the disease.
5. The establishment of more whooping-cough clinics, at least one in each borough.
6. The organization of a boat camp for the rational treatment of pertussis, especially during the summer time, should be carefully considered.
7. The use of a suitably constructed pertussis hospital, in which the care of patients with severe attacks of whooping cough could be more efficiently undertaken and which would afford an opportunity for further scientific research on laboratory, as well as clinical lines.—(R. H. LANING.)

ROSENOW, E. C. The etiology of cholecystitis and gallstones and their production by the intravenous injection of bacteria. Jour. Infect. Dis., October, 1916.

In the preface to his article the author states that the lodgment and growth of bacteria in the gallbladder have been considered chiefly as accidental, notwithstanding the fact that bacteriemia occurs in numerous diseases in which cholecystitis is absent. Attempts by investigators to produce cholecystitis by simple intravenous injection of various bacteria have usually resulted in failure. The typhoid bacillus, however, quite irrespective of its source, has given positive results in the hands of Blachstein, Welch, Cushing, Koch, Gay, Claypole, and Nichols.

During the course of experiments with laboratory strains of streptococci, he noted that lesions of the gallbladder followed intravenous injection of these strains only when the virulence had attained a certain point. Two years ago he reported a case in which cholecystitis had occurred 10 days after tonsillitis, and in which the streptococcus had been isolated from the wall of the gallbladder, and from the center of the newly formed gallstones. This streptococcus had shown a far greater affinity for the gallbladder in animals than had streptococci from other diseases.

In the present paper he wishes to record the results of cultures by special methods from the liquid contents of the gallbladder, from the centers of gallstones, from the wall of the gallbladder, and from the adjoining lymph glands removed at operation in a series of cases of cholecystitis and the results of animal experiments with the bacteria thus isolated. These results, it is believed, throw definite light on the mechanism of the occurrence of cholecystitis and gallstones.

The results of his experiments are then given, both tabulated and otherwise, and, under summary and general discussion, he states as follows:

The results thus detailed were obtained over a period of two years, in different localities, during different seasons of the year, and in different species of animals. The number of animals injected with some of the strains was sufficiently large to prove beyond doubt the elective property of strains isolated. Streptococci and colon bacilli from acute cholecystitis gave rise to more marked lesions in the gallbladders of dogs than did those from chronic cholecystitis. In some strains the virulence could be diminished by cultivation or increased by animal passage and the affinity for the gallbladder still retained. Usually, however, this affinity was lost. Strains grown on artificial media acquired distinctly greater affinity for the pancreas.

In one case ulcer was produced in animals with streptococci isolated from the lymph gland draining the duodenal ulcer, and cholecystitis was produced with streptococci from the gallbladder. These results furnish experimental evidence that ulcer and cholecystitis in the same patient at times may be due to hematogenous infection by streptococci which have these respective powers of localization. A single strain, however, may have affinity for both structures, as shown in numerous experiments.

The simultaneous occurrence of lesions in the gallbladder and in the cystic and common ducts following injection of the streptococcus from the gallbladder where these structures were involved, indicates that the lesions may be due to the wide range of affinity of the infecting microorganism. The occurrence at the same time of cholecystitis and pancreatitis in the animal injected with bacteria from acute cholecystitis and pancreatitis, and with strains from chronic cholecystitis and from ulcer after animal passage, suggests that the simultaneous presence of the disease in the same patient is due commonly in the beginning to hematogenous infections and not so often to lymphogenous or local invasion as the findings at operation so often appear to indicate.

The demonstration of streptococci in the involved tissues in a high percentage of cases of chronic cholecystitis, the elective affinity of these organisms for the gallbladder in animals, and the production of the disease with the strains isolated from the experimental lesions, indicate that streptococci are a cause of cholecystitis. The importance not only of draining but of removing gallbladders is apparent, especially in the absence of stones, as already emphasized by Mayo and others. This is especially true in cases of chronic cholecystitis. Gallbladders removed in chronic cholecystitis during the quiescent interval have been demonstrated to be the host of living bacteria. Might not the periodic exacerbations be due to resumption of activity on the part of a latent infection, when the defensive mechanism of the individual is low? The fact that streptococci, which produced marked cholecystitis by systemic intravenous injection, failed to produce cholecystitis when injected into the radicles of the portal vein, or when injected directly into the gallbladder, is crucial evidence that cholecystitis in the absence of stones is very frequently of hematogenous infection, and rarely the result of invasion from the bile.

The results of differential cultures in both spontaneous and experimental cholecystitis show that the colon bacillus is commonly a secondary invader in an infection with streptococci or in a mechanical injury produced by previously formed gallstones. That it is the primary cause of cholecystitis in some instances is quite certain, because one of a series of strains of the colon bacillus from cholecystitis was present in pure culture and showed elective affinity for the gallbladder in animals. In one case, cholecystitis, which had begun during convalence in typhoid fever, was proved to be due to streptococci; hence it would seem that cholecystitis occurring in typhoid fever is not always due to the typhoid bacillus.

The common presence of bacteria in the centers of gallstones, the formation of gallstones in association with cholecystitis following injection of streptococci as observed in nine instances, and the presence of the streptococci in the newly formed stones, emphasize anew the important rôle which infection plays in the etiology of gallstones. The almost complete absence of bacteria in the four pure cholesterin stones is in accord with the views of Aschoff, Henes, and others, who emphasize the importance of a high cholesteremia as a causative factor in the formation of gallstones. Streptococci have been isolated from the walls of gallbladders and demonstrated there in cases of chronic cholecystitis without stones. It would appear, therefore, that for the formation of gallstones two factors are usually necessary: (1) Infection furnishing the nucleus for the precipitation of bile salts, etc., and (2) a concentrated bile of high cholesterol content.—(R. H. LANING.)

MENTAL AND NERVOUS DISEASES.

R. SHEEHAN, Passed Assistant Surgeon, United States Navy.

CRAIG, C. B. **Injuries to the peripheral nerves produced by modern warfare.** Am. Jour. Med. Sc., September, 1916.

The writer gives his observations of this class of injuries based upon his experience of 10 months with the American Ambulance and impressions made by visits to various hospitals abroad. He confines himself to the aspect of neurological injuries in which a marked paralytic effect was produced distal to the wound, indicating that one or more of the principal nerve trunks had been damaged. He notes that varying degrees of disability in the nerves below the point of injury are seen. The suspension of function may be due either to direct violence of the missile, flying fragments of bone, or to the resulting hemorrhage and edema of the part, or to cicatricial pressure during healing. The subsequent disability may be motor or sensory, or both. Mild cases of loss of function in the hands or feet from wounds with hemorrhage and edema in the extremity above them clear up rapidly, provided the part is immobilized.

One of the greatest lessons learned in the war in taking care of wounds on a large scale is to avoid immobility of a wounded extremity, this to avoid so-called causalgia. The infrequency of completely severed nerve trunks was quite remarkable, being only 10 per cent of peripheral nerve injuries. This must be due to their resiliency and elasticity, which permit a certain degree of displacement without rupture. All the symptoms of complete severance may be present from severe contusion or compression of the nerve.

The proportion of peripheral nerve injuries to the total number of wounded was approximately as follows:

	Per cent.		Per cent.
Musculospiral	12	Sciatic	10
Ulnar	9	Obturator	.5
Median	9	Long saphenous	.3
Circumflex	5	Popliteal	2
Internal cutaneous	4		

Injuries to the sciatic nerve are much the most painful, whereas those of the nerves of the arm are more apt to result in paralysis. The commonest motor paralysis is that of the musculospiral, due doubtless to the location of the nerve close to the humerus so that fracture of the latter by rifle ball invariably causes a paralysis of the musculospiral nerve.

A large number of cases are cited to show treatment and results and the following conclusions are made:

Laceration and contusion may be differentiated usually by careful neurological examination. In some cases exposure of nerve at the site of injury is the only means by which exact knowledge of the nature of the injury is obtained. Neither test of function nor electrical reaction will differentiate contusion from laceration.

Cases of simple contusion recover slowly, and as a rule completely.

Gunshot and shell wounds causing lacerations of the nerves do not lend themselves readily to plastic operations. Because of the infection, weeks and months elapse before plastic work can be undertaken. During 10 months no recovery in such cases was observed.—(R. S.)

HOCH, A. **The dementia of cerebral arteriosclerosis.** Psychiat. Bull., July, 1916.

This was part of a symposium on dementia read at the annual meeting of the American Psychopathological Association, Washington, D. C., May, 1916. The writer endeavored to outline the characteristics of this form of dementia in so far as they indicated one of the ways in which the mind may undergo destructive changes. In arteriosclerotic brain disease, though the mental possessions become more and more reduced, the central feature in the clinical picture of the cases is a diminution of mental tension, as a part of which there is difficulty in elaboration of external events and in orientation, the difficulty in fixation and retention, the discrepancies and the perseveration with the aphasic symptoms and final breaking up of the train of thought.

This defect of mental tension is remarkably isolated. It is neither the result of, nor associated with, a defect of those complicated instinctive affective reactions which we call personality. On the contrary, these reactions are strikingly well preserved, or, at any rate, can only not be called forth when the defect of mental tension does not permit the stimulus to get through. Perhaps, owing to some deeper relationship with the above facts, psychotic manifestations are relatively rare or simple, and it looks as if possibly constitutional tendencies are wiped out rather than called forth.

It is mainly the purity of the mental-tension defect which characterizes arteriosclerotic dementia.—(R. S.)

MACCURDY, J. T. **Epileptic dementia.** Psychiat. Bull., April, 1916.

This is an effort to formulate the reaction type which may be more nearly related to the basic physical factors of epilepsy. The epileptic by virtue of his make-up gets less satisfaction out of social life than his normal fellow, and therefore his adaptations are less stable. When external circumstances make their maintenance difficult they dissolve; with this dissolution comes a loss of interest, this leads to a lowered mental tension and intellectual decay. The process is cumulative, ending in a complete loss of personality and every sign of intelligence. Whatever organic factor or factors may underlie this change we do not know, but this much seems certain, deterioration is potentially present in the epileptic make-up; it is as much a feature of the disease as are the convulsions, and is probably a product of environmental maladjustment.—(R. S.)

CAMPBELL, C. M. **The nature of the dementia in dementia paralytica.** Psychiat. Bull., July, 1916.

This also was a part of the above symposium. Campbell considers in the center of the dementia of dementia paralytica the degradation of those complex reactions which are the essence of the personality, the deterioration in the directing forces of the personal activity, the loss of that synthetic grasp of personal memories which gives them complete unity, the progressive disappearance of the constituent memories, of the store of acquired information and skill, of simple and complicated associative processes.

The nondemential symptoms such as the delusions, in their unsystematized and poorly elaborated structure, are liable to show the influence of the demential background. They show a disintegration of the self and not merely, as in some other conditions, a perverted attempt at the extreme realization of self. The dementia is characterized, not merely by the deterioration of the individual as a social unit, but by the general deterioration of all those reactions, simple and complex, personal and impersonal, through which the individual responds as a unit to his environment.—(R. S.)

FARRAR, C. B. **Some factors in schizophrenic dementia.** Psychiat. Bull., July, 1916.

The author's conception is that the mental deterioration in the end stages of dementia precox is the result and a part of a specific imperfect type of psychobiological evolution. The essential element in this evolutionary type would seem to be a lesion of the personality sense; more particularly a special incomplete development of the personality sense, with the associated feeling, more or less definite, of inadequacy. With normal mental anlage and environmental conditions not excessively unusual, there follows normal mental life as a series of successful adjustments to the succession of environmental changes, with the developmentally imperfect anlage of the schizophrenic type. There is an individually variable period of compensation during which a sufficient degree of adjustment to environment is possible. Eventually this adjustment possibility ends, oftenest at or near the time when adjustment difficulties are greatest, namely, when the individual must take the last step in becoming a completely independent social unit.

From this time forth the sense of personality does not simply continue at the level it has reached. It rather tends to undergo a progressive resolution. Characteristic of this psychic catabolism or depersonalization are autistic and schizophrenic trends. Objectively the process shows as an affective-volitional deterioration, with the loss of the self and potency factors in purposive consciousness; the logical tendency is toward inertia. Such is the way with the typical progressive case. Unfortunately the concept of compensation is in the nature of things far from exact. With greater precision of knowledge on this point we should perhaps be in a position better to account for individual variations in the course of the disease, including the apparently restored compensation of remissions and in the so-called recoveries with defect.—(R. S.)

SURGERY.

A. M. FAUNTLEROY and H. F. STRINE, Surgeons, United States Navy.

COLYER, J. F. **The treatment of gunshot injuries of the jaws.** Jour. Roy. Army Med. Corps, xxvi, No. 5, May, 1916.

In the Croydon War Hospital one section of 166 beds is devoted entirely to jaw cases. In the first six months after the hospital was opened 204 were under treatment.

"Gunshot wounds of the jaws differ materially in their character from the ordinary fractures met with in civilian practice, and in the present war this is more especially the case owing to the high velocity of the bullets and the highly explosive character of the shells and bombs." The treatment of these cases necessarily can not be carried out according to our ideas of treating such cases. The main object, of course, is saving the life of the patient, and if splints and wiring be attempted too soon sepsis may be increased and the patient lost.

After the chances of sepsis are minimized some surgical measures may be attempted to adjust the parts and secure union of the jaw. It is best, of course, to restore the parts to their normal position and occlusion, but if in doing this one has to take the chances of nonunion of the bone, it is much better to sacrifice the normal occlusion and have a firm bony union which will be of service in mastication than to have an ideally shaped arch which will be of no service in mastication.

Upon admission of a patient brief notes are taken; a roentgenogram made; models of the mouth made; mouth washes are frequently used; the gums are painted daily with 2 per cent solution of iodin; all old roots are removed, as well as one tooth each side of the fracture; sequestrated, necrosed bone is removed; splints are then made, adjusted, and left in place until union of bone is completed.

One of the main obstacles found in the service is a proper diet, which has to be made up from only such foods as are in the Army ration. All the patients who have received jaw injuries rapidly lose weight, and the question of suitable diet is a difficult one.

The splints used in these cases are the Hammond wire splint, Payne's cradle splint, metal-cap splint, Gunning splint of either metal or vulcanite, and the skull and mandibular splint.

Where there is much loss of tissue the parts are allowed to form a fibrous union, and later metal-cap splints are made and adjusted as near as possible to the original position of the jaws. The teeth are then brought to normal position if possible and slipped into the caps in the splint, in which position they are held for several hours daily. This puts the parts forming fibrous tissue on a strain, with some discomfort, but soon brings the jaws in proper occlusion, in which position they are held until bony union is completed.

The removal of a tooth on each side of the line of fracture is found to aid materially the union of the parts, as often a portion of a root is fractured which lies in the line of union, causing much irritation and delayed union.

The plating of septic comminuted fractures is useless, as union is delayed and ofttimes prevented altogether, it being more difficult to establish antisepsis.

It has been found that if cases can be brought under proper dental treatment soon after the receipt of injury, rapid and good recovery is the rule.—(F. L. MOREY.)

MANN, A. J. **Nails and screws in joint surfaces.** Surg., Gynec., and Obst., November, 1916.

After a very large number of experiments on dogs, the author's conclusions are as follows:

Nails and screws are tolerated in joint surfaces in the human as well as in the experimental cases, and with surprisingly little reaction.

They have remained firmly embedded in every specimen recovered.

In every case where the nails and screws projected above the joint surface, there was a distinct upbuilding of the condyle, as nature's reply to a rigid metal body projecting into the joint.

It is exceedingly interesting to find that the increase in joint level seems always due to the growth of bone and not to the increase in the thickness of the cartilage.

In each case where tissue grew across over the head of a nail or screw, or across in the groove of the screw, the new tissue showed a reversion to the connective-tissue type.

Even when the nails and screws have remained more or less uncovered, the dogs have run about normally after a short convalesence.

In each case the scratch or groove on the opposing surfaces was filled in as the projection of the nail or screw lessened by the upbuilding of the condyle. The defect was apparently entirely filled in all but one specimen, and this was closing in nicely at the end of six weeks.

As a point in technic, it seems better to swing a hinge joint freely at time of operation, to scratch the groove made necessary by a badly placed nail or screw, and thus save the time and pain which would be required in scratching the groove little by little later.—(A. M. F.)

ESTES, W. L. **Fractures of the femur.** Ann. Surg., July, 1916.

As regards indications and results in the open method of treatment of fractures of the femur, the author has to say: " To treat the question dogmatically, I would say, fractures of the neck within the capsule should always be treated conservatively (the late J. B. Murphy believed otherwise). The open method may be used in such cases only when the head has been dislocated from the acetabulum.

Fractures of the upper third offer especial and cogent indications for the open method. Fractures of the middle third may be best treated by the open method if they are transverse and can not be reduced by general anesthesia, traction, and manipulation. Oblique fractures which have short, irregular bevels or shoulders, and those which have markedly been displaced and have gathered on the ends and between the fragments a quantity of fascia, muscles, etc., are indications for the open-treatment method.

"A fracture of the lower third, if it be one which has the lower fragment tilted backward in such a way that it has been entangled in the lacerated fibers and fascia of the heads of the gastrocnemius muscle and hamstring tendons and can not be replaced under ether by manipulation and flexion, should, as a rule, be treated by the open method.

"In general, a fracture of any sort of the femur, except its neck, which can not be reduced under anesthesia and retained in position by some proper apparatus by the middle of the second week, should have the benefit of an open operation unless there is a contraindication in the condition of the patient or there exists some strong social or medicolegal consideration against it.

"In determining the question of open or closed method, the surgeon should never forget that a finite operator doing an open operation on a human being can never be sure he is not introducing some sort of sepsis. There is, therefore, always a possible added danger in open operations.

"Furthermore, open operations for fractures of the femur require large wounds and are not easy operations to perform. They may prove a serious tax on the strength of the patient and must never be lightly performed. The surgeon should not forget all this and he should make the patient appreciate the main factors of the probable results without the operation and its added danger if undertaken.

"The advantages of the operation are (1) direct ocular examination of the condition of the fragments; (2) reposition and fixation by direct splinting of the bone while under one's eyes; (3) evacuation of the blood and detritus about the fragments; (4) a condition almost painless during aftertreatment and convalescence; (5) much more freedom of movement in bed while convalescing; (6) earlier employment of passive movements and massage.

"As regards results, our experience has been that the operated cases require a little longer period of hospital disability—probably three weeks longer.

"The alinement is always good and very rarely does any bowing occur afterward, unless the patient is allowed to bear weight too early. In every instance, so far as we have been able to follow our cases, the patient has been able to return to his former job, excepting one, who fractured his bone while still in the hospital. He has considerable overlapping and callus and shortening as the result of his last fracture, which was treated without operation.

"The average period of disability for fracture of the femur worked out in our cases is 13 months. This means the time a laborer may count as necessary before he may, with confidence, return to his hard work. Most cases leave the hospital in 10 weeks, walking with the aid of a cane or crutches, but it requires a much longer period for them to be able to do a full day's work."—(A. M. F.)

OCHSNER, A. J. **Surgery of the colon as applied to intestinal stasis.** Illinois Med. Jour., August, 1916.

Under physical examination, bearing on the value of X-ray diagnosis, the following extracts are copied. Although it is found inexpedient to reproduce the plates, the descriptions in each case are lucid and valuable.

For a number of years the X-ray examination has been given much prominence. When there has been marked displacement of the colon, or an incompetence of the ileocecal valve, or an evident dilatation or elongation of the sigmoid flexure, when viewed through the fluoroscope or examined by means of X-ray plates, the clinician has looked upon these conditions as unquestionable evidence of marked intestinal stasis. In order to determine the value of these findings, we have examined an enormous number of patients who were evidently suffering from intestinal stasis, as well as a large number of cases that were perfectly normal, and another series of cases in which the patients were suffering from diarrhea. The following illustrations will serve to demonstrate the results of this investigation:

No. 1 shows the colon with rather a low hepatic flexure and a sharp turn at the splenic flexure and an enormously enlarged sigmoid flexure. This plate was taken without giving the patient atropin.

No. 2 shows the same patient 20 minutes after having been given one-fiftieth of a grain of atropin hypodermically. In this plate the cecum is greatly overdistended. The transverse colon has dropped down markedly and the sigmoid flexure is distorted, while the dilatation is confined to the upper portion of the rectum and the lower portion of the sigmoid flexure.

No. 3 shows what was at one time considered a normal position of the colon with a high hepatic flexure which dips down toward the pelvis before the transverse colon begins its course toward the splenic flexure. The sigmoid is again enormously distended.

No. 4 shows almost the exact duplicate of this, with chronic diarrhea.

No. 5 gives almost exactly the same position witih a still further exaggerated dip beyond the hepatic flexure of the colon in a patient who is perfectly normal regarding the action of the bowels.

No. 6 shows an enormously distended cecum and transverse colon with a small descending colon and a somewhat dilated sigmoid. There is a marked dip of the transverse colon before it finally ascends to the splenic flexure.

No. 7 shows apparently the same condition with the dip of the transverse colon before it ascends to the splenic flexure. This patient is suffering from diarrhea. Had he suffered from chronic constipation one would at once have attributed this condition to the dilated sigmoid.

No. 8 shows a dip at the hepatic flexure of the colon and a greatly distended sigmoid flexure. This patient is perfectly normal concerning the intestinal stasis.

No. 9 shows a dilated cecum and greatly dilated, elongated sigmoid. This patient is suffering from constipation.

No. 10 is almost an exact duplicate of No. 9, the patient suffering from chronic diarrhea.

No. 11 has an enormous dilatation of the cecum and transverse colon and sigmoid, while the descending colon is perfectly normal.

No. 12 shows quite an extraordinary dilatation of the descending and transverse colon. The condition of the sigmoid is not very plainly shown. In this case the condition of dilatation would readily show chronic constipation.

No. 13, however, shows almost an equal amount of dilatation of the ascending colon and greater dilatation of the sigmoid, and still this patient is suffering from chronic diarrhea.

No. 14 shows a fair amount of dilatation of the ascending colon, a marked dip beyond the hepatic flexure, a great amount of dilatation of the transverse and descending colon and sigmoid, and a distention of the small intestines, showing that there is present an incompetence of the ileocecal valve, permitting the contents to back up into the small intestines.

No. 15, an enormously distended ascending colon, a moderate dilatation of the transverse colon and sigmoid flexure, and an incompetence of the ileocecal valve, and in this case the presence of chronic constipation might be expected from the X-ray findings.

No. 16 shows a condition almost exactly like No. 15, but here we have a condition of chronic diarrhea.

It is perfectly plain that any observer, without regard to the amount of experience he might have had in reading X-ray plates, would be entirely at sea were he forced to depend upon these X-ray findings as a basis for his diagnosis. When done in connection with a carefully written history and a physical examination, these X-ray findings, however, have a certain degree of confirmatory value.

As a matter of fact, however, their chief value lies in their ability to visualize a condition so that the patient and especially his friends can be convinced of the necessity of operative interference. There can be no doubt that innumerable useless and harmful operations have been performed because the surgeon or his patients or both have been deceived by the apparently perfect demonstration of the presence of intestinal stasis by means of X-ray plates similar to those described above. And the chief object of presenting this group of plates is for the purpose of demonstrating their absolute unreliability.—(H. F. S.)

HYGIENE AND SANITATION.

C. N. FISKE, Surgeon, and R. C. RANSDELL, Passed Assistant Surgeon, United States Navy.

PETTIBONE, D. F., BOGART, F. B., and CLARK, P. F. **The bacteriology of the bubble fountain.** Jour. Bacteriol., September 1916, page 471.

An epidemic (50 cases developing within a week) of streptococcal tonsillitis in a domitory at the University of Wisconsin caused the authors to make a study of the "bubble fountains" at the university. These fountains have vertical terminals and owing to low water pressure it was almost impossible to drink from the fountains without touching the lips. Seventy-seven fountains were examined and 43 "were found contaminated with Gram-positive streptococci," which were slightly virulent upon animals. A similar examination of the fountains one year later showed confirmatory results. The organisms were found inside the fountains and on and in the terminals. Almost a pure culture of streptococci was found inside the fountain in that part of the dormitory in which the largest number of tonsillitis cases developed. The water supplied to the fountains was deep-well water and should have been free of contamination. In order to eliminate this possible source of streptococci the water before entering a fountain was permitted to flow through a Berkefeld filter for a period of one week, and cultures made from the filter failed to show either streptococci or other Gram-positive organisms. Repetition of this control gave similar negative results. By their experiments with jets of varying heights the authors appear to have established a relation between height of jet from the fountain and infection of the fountain. Having proved the water in an experimental fountain to be free of *B. prodigiosus*, 2 mils of an emulsion of 24-hour culture of *B. prodigiosus* were dropped by pipette into the terminal of the fountain, care being exercised to prevent touching the metal, and by this process it was determined that with a column of water 3 to 4 mm. high *B. prodigiosus* was found in cultures taken at intervals for 135 minutes; when the column was 2 to 3 cm. high *B. prodigiosus* persisted from 10 to 90 minutes; with a column 7.5 cm. high, for 20 minutes, and with a column 10 cm. high *B. prodigiosus* has been invariably present in plates made one or two minutes after introduction of the test organism. Approximating actual conditions the following test was made. The authors rinsed their mouths with suspensions of *B. prodigiosus* and drank from a test fountain after several controls negative for *B. prodigiosus* had been obtained from the fountain, and before their lips were dry after rinsing the mouth with a suspension. *B. prodigiosus* was shown to be present in the water so late as 20 minutes after the mouths infected with *B. prodigiosus* had drunk at the fountain. The authors think that the "organisms dance in the column of water much as the toy ball dances on top of the fountain in the garden." As a remedy for conditions it is suggested that the terminal be set at an angle of 50° from the vertical.

Experimental evidence of the efficacy and efficiency of this device is adduced.—(J. C. PRYOR.)

GABEL, C. E. **Bacteriological examinations of swimming pools in Manila.** Philippine Jour. Sc., March, 1916.

From a series of tests of the waters of various swimming pools in Manila the author concluded as follows:

"The general results of the experiments, as far as the bacterial count is concerned, may be summarized as follows:

"1. When no disinfectant was added, there was a steady increase in the number of bacteria in the swimming pools. This increase was exceedingly high on the last day of the week the water was used.

"2. When the disinfectants were used, the bacterial curve was lowered and often became more irregular.

"3. Copper sulphate applied at the beginning of the week permitted an increase throughout the week, but sometimes a slight reduction occurred.

"4. Calcium hypochlorite applied once a week showed good effects at first, but permitted too large an increase of bacteria toward the end of the week. A daily addition amounting to 0.25 part of available chlorin per million parts of water permitted a considerable increase of bacteria, while 0.5 part gave the best results.

"When the comparative cost and disinfecting power are considered, antiformin and copper sulphate are not as valuable as calcium hypochlorite. The latter, when added daily in amounts equivalent to 0.5 part chlorin per million parts of water, is recommended for the disinfection of these swimming pools, as it is the best and most economical means of keeping the number of intestinal and other bacteria within safe limits throughout the week in which the same water is used."—(R. H. LANING.)

MILLER, J. A., and COCKS, G. H. **The effect of changes in atmospheric conditions upon the upper respiratory tract.** Tr. Am. Climatol. and Clin. Assn., 1915, pp. 1–29.

This investigation, conducted under the auspices of the New York State Commission on Ventilation, is of unusual importance and interest. The authors point out that our knowledge of the fundamental principles upon which the action of fresh air upon the body in health and disease depends is inadequate and to a considerable extent unsatisfactory. The scanty literature on the influence of various atmospheres upon the upper respiratory tract is reviewed. On summing up the results of the various observations and opinions they find it difficult to arrive at a satisfactory conclusion as to the exact place of atmospheric changes of temperature in the production of respiratory disease. The present paper places direct observations upon the respiratory tract under conditions absolutely controlled as to temperature, humidity, and air movement.

Two adjoining rooms, approximately 10 by 14 feet each, were utilized for the experiments and so arranged that any desired degree of temperature and humidity could be secured and recorded; room A as the control room and room B as the observation room.

The terms used in defining the conditions of temperature employed are as follows:

	Fahrenheit.	Relative humidity.
	Degrees.	*Per cent.*
Normal	68	50
Cold	50	50
Hot dry	80	20-30
Hot medium	80-86	50
Hot moist	80-86	80

Clinical examinations of the nasal passages: Glatzel mirror records were made and proved very useful as a more exact method for estimating qualitatively the amount of nasal obstruction caused by changes in atmospheric conditions.

The following is the method carried out in series A, test 1, which is typical of the plan pursued in all experiments. In test 1, where the effect of the change from the normal room to a hot room with medium humidity was studied, the subjects were placed in the normal room for one to two hours. At the end of this time each subject was examined, a careful record made, and a Glatzel plate record taken. The subjects then entered the hot experimental room, were examined immediately, and a Glatzel plate record taken at the time when the greatest change was observed clinically. They remained in the hot room for from one-half to two hours.

Summary: (1) Exposure to heat in the majority of normal subjects causes increased swelling, moisture, and redness in the nasal mucous membrane. (2) Exposure to cold, conversely, causes a diminution in swelling, moisture, and redness. (3) The effects of exposure to heat are more marked if the humidity of the air is high. (4) Air currents or drafts directly upon the face materially modify the effects of changes of air temperature upon the nasal mucous membrane. High temperature with drafts results in a diminution of swelling and secretion, and low temperature with drafts in an increase in these conditions. (5) Our clinical and animal experiments fail to demonstrate that any definite reflex effect upon the nasal mucous membrane is produced by exposing the surface of the body to extremes of temperature or to drafts. (6) Workers subjected for long periods to high temperature and humidity, such as laundry workers, exhibit an atrophic rhinitis in an abnormally large percentage of cases. Workers exposed to drier heat, as in boiler rooms, also show a high percentage of atrophic rhinitis, but less than the group of workers in moist heat. (7) The nasal mucous membranes of such workers react to changes in atmospheric temperature and humidity quite differently from normal subjects.

Conclusions: (1) The circulatory reactions in the nasal mucous membrane produced by changes in atmospheric environments are too frequent and definite to be disregarded as a probable predisposing factor in the incidence of bacterial infection of the upper respiratory tract. (2) Change of temperature is the most important atmospheric condition in the production of these reactions. (3) The effect produced upon the nasal mucosa by changes of temperature and by drafts is direct rather than a reflex from distant surfaces of the body. (4) Prolonged and regular exposure to high temperature frequently results in atrophic rhinitis. This condition is a more probable result of moist heat than of dry.—(E. W. BROWN.)

WINSLOW, C.-E. A. **The kata-thermometer as a measure of the effect of atmospheric conditions upon bodily comfort.** Science, New York, N. S., xliii, pp. 716–719.

The author points out that it has been definitely established that the unfavorable effects of the air of a badly ventilated room are chiefly thermal rather than chemical in nature. It is generally recognized that the ordinary thermometer is a very inadequate measure of the discomfort felt, because the heat loss from the body surface is influenced not only by the temperature of the surrounding air but also by the humidity present, and the radiant heat which reaches the body, and above all by the movement of the air. The condition in a close room has been commonly compared with that which obtains outdoors on a muggy day in summer, yet it is clear that the outdoor temperature must be very much higher in order to produce a comparable degree of discomfort.

The kata-thermometer devised by Leonard Hill consists of two especially constructed thermometers with large bulbs and stems graduated from 86° to 110 F., one to be used as a dry and the other as a wet bulb. The bulbs are heated to about 110° and then placed in clips, which hold them in a horizontal position. The time taken to fall from 100° to 90° is then noted by a stop watch.

The rate of fall of both thermometers will obviously be affected by air movements and radiant heat as well as by air temperature, and that of the wet bulb by the humidity of the air as well. Hill believes that the combined influence of these factors will affect the kata-thermometer very much as it does the human body, and suggests a one-minute period for the wet and a three-minute for the dry bulb as upper limits for comfortable atmospheric conditions.

Winslow considered that the instrument promised to be of valuable assistance in the practical study of ventilation problems. He carried out a number of observations to determine how clearly its records correspond with sensations of bodily comfort.

At the time each observation was made from 3 to 20 observers were asked to express their opinion as to the comfortableness of the atmospheric conditions on a scale of 5 as follows: 1, cold; 2, cool; 3, ideal; 4, warm; 5, hot. The results of the comfort vote have been plotted against wet and dry bulb readings in a diagram. From a general discussion of the data it is concluded that the instrument is of great value in measuring the actual influence of air conditions upon the body, and is greatly superior to the ordinary thermometer for this purpose. The general value of the kata-thermometer seems sufficiently obvious to warrant its general use in the study of atmospheric conditions as they affect bodily comfort.—(E. W. BROWN.)

Savage, W. G., and Read, W. J. The significance of streptococci in water supplies. Jour. Hyg., London, xv, No. 3, September, 1916.

These investigators through bacteriological examination of well waters more or less liable to surface contamination sought to determine what light the streptococcus content might throw on the probability of water showing high colon bacilli content being caused by human or animal origin, and the probable proximity or remoteness of contamination as to time, the colon bacilli enumeration being inconclusive as to the latter point and of no value in the former.

They conclude that "the results of the analyses studied in bulk and detailed consideration of individual supplies yield results which are essentially the same.

"The absence of streptococci (at least with the methods used) is of less significance than their presence. Absence of streptococci, even from a considerable bulk of the water, can not be accepted to the same extent as absence of *B. coli* as reliable evidence of the freedom from serious contamination of the water at the time the particular sample was collected, although it is a point in favor of its purity.

"Standards for permissible number of streptococci broadly correspond to similar numerical standards of *B. coli*, but are of less significance and reliability.

"While we do not know enough about the varying vitality and distribution of streptococci to say whether the presence of certain strains may or may not be disregarded as evidence of excretal contamination, it is, in general, reliable to assume that streptococci in large numbers are only present in waters from unsatisfactory sources.

"We are decidedly of opinion that the streptococcus estimation, carried out by the simple method described, is of undoubted value as evidence for or against excretal contamination.

"We think further that if the reliability of the method could be improved the value of the streptococcus enumeration would be enhanced and even more clearly demonstrable."—(C. N. F.)

FISHER, I. **The mortality of our public men.** Quart. Pub. Am. Statist. Assn., xv, No. 113, March, 1916.

The longevity of all Presidents, Vice Presidents, and 7,500 Congressmen, with reference to age and tenure of office, has been studied and compared with expectancy of American experience tables and the actual longevity of Yale presidents and graduates.

The longevity of our Presidents and Vice Presidents "seems to be diminishing with the increasing complexity of modern life in Washington," but the latter "seem to live out a smaller fraction of their expectations," which fact "would suggest that the official social and convivial life at Washington is a greater life shortener than the heavy responsibilities of office." The "simple" life of the Yale presidents is the long one and the "complex" life is the short one.

The figures "fit into the following hypotheses: (1) Congressmen are a select group having unusual vitality, and therefore a low mortality at the outset; (2) congressional life with its responsibilities, heckling, excitements, worries, indoor and sedentary life, late hours, dining, wining, and other unhygienic conditions makes a severe drain on this vitality, showing itself in a gradually increasing mortality; and (3) some Congressmen contrive to avoid or to correct these unhygienic conditions and cause a partial return toward the original low mortality after their less careful colleagues have died. At any rate the cardinal fact is clear that some cause or causes connected with entering Congress tends to kill Congressmen. They enter with more than the average vitality and after a single term of office possess less than the average vitality."

The tables show "that, in general, those who have been in public service the longer time have a mortality of 120 per cent as compared with 97 per cent for those who have served the shorter time. This contrast is the more marked the older the men when retiring from Congress. Among those retiring at 60 years of age or older the ones who keep in public service the longer show a mortality of 124 per cent as contrasted with 74 per cent for those who have served the shorter time. Thus the killing pace of public life is more killing to the older men than to the younger.

"The chief causes of wear and tear on the lives of Congressmen are the same as those applying to modern convivial social life in general; they are the causes emphasized by the Life Extension Institute, which, through its hygiene reference board of hygienists and scientists, has described these causes in its recent handbook, How to Live. The chief causes emphasized are indoor and sedentary living, a crouching cramping posture, late dinners, overeating, especially of nitrogenous foods, such as meat and eggs, overconcentration or lack of bulk in diet, hasty eating, constipation, irregular hours, lack of sleep, worry, and the use of drugs, especially narcotics like alcohol and tobacco. In short, the chief reasons why Congressmen shorten their lives are avoidable, being due not so much to their work as to the kind of lives into which their lives lead them.

"The damage to vitality which we find from public life is not, therefore, put forward as an argument against entering public service; nor will a knowledge of the facts probably tend in that direction, certainly not among those who place public interests above personal interests, as every public man should. But knowledge is power, and a knowledge of the facts should enable us to protect our public men or enable them to protect themselves, and to do so in the public interest. This can be accomplished by better general health conditions in the country and its Capital, by better health customs and habits, by better health ideals, and by a more systematic application of the imperfect ideals already existing."

The conclusions well merit consideration by officers undertaking duties involving strenuous administrative functions, whether in Washington or elsewhere, so to order their lives as not to burn the candle at both ends.—(C. N. F.)

Formaldehyd fumigation. Merck's Report, xxv, October, 1916.

As a substitute for the almost unobtainable and very expensive potassium permanganate the formula for the sodium dichromate method has already been reviewed in this section (January, 1916, pp. 166 and 169).

In the present notice, taken from the Western Drug Record through the National Druggist, the following would appear most practicable to replace the potassium permanganate method for the Navy.

CHLORINATED LIME METHOD.

Place in mixing pan, chlorinated lime	12 oz.
Water (add and stir to paste)	4 oz.
Formaldehyd, U. S. P. solution	1 lb.

Pour over the moistened lime.

Use same precautions as heretofore in the permanganate method. The above is sufficient to fumigate 1,000 cubic feet of room space.—(C. N. F.)

LANGWORTHY, C. F., and HOLMES, A. D. **Digestibility of very young veal.**[1] Jour. Agric. Research, vi, No. 16, July 17, 1916.

Throughout the United States little was known until recently regarding very young veal, since the sale of calves less than 3 to 6 weeks old for food is prohibited by Federal and State laws. Our attitude toward veal, as toward many other foods, has been determined in part by custom and prejudice and in part by economic conditions and experience, often being illogical; therefore it is of interest to ascertain in such cases how far belief is justified by facts, as shown by controlled experimental tests.

That the common opinion that veal is less wholesome than beef and young veal less so than mature veal is not a consistent prejudice against young flesh foods is shown by the common and apparently growing taste which prefers squab to pigeon, ranks broilers as superior to fowls, considers sucking pig a great delicacy, and regards hothouse lamb—that is, lamb less than 3 months old and rapidly grown and fattened—as much superior to older lamb as lamb is to mutton.

As determined by the experiments herein reported, the digestibility of the protein of bob veal is the same as that found for market veal—namely, 93 per cent, in round numbers. The subjects of both dietary and digestion experiments, so far as could be learned, experienced no physiological disturbances during the experimental period or afterward. The tests showed that such veal can be prepared for the table in palatable ways, and that so far as could be judged it was not unwholesome when eaten in quantity. In the digestion experiments the average weight of protein supplied by the meat exceeded that generally furnished by the meat portion of the ordinary diet, indicating that very young or bob veal was not distasteful. The experiments here reported also indicate that the general opinion that young veal is a common cause of digestive disturbance or fails to digest as thoroughly as similar foods is not justified.—(R. C. R.)

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[1] See review in NAVAL MEDICAL BULLETIN, April, 1916, p. 368.

RAMSEY, W. R., and SCHOBERG, H. M. **Report of eighty-two cultures taken from physicians' clinical thermometers.** Wisconsin Med. Jour., xv, No. 3, August, 1916.

The authors made some commendable investigations of the but too prevalent carelessness as regards carrying of contagion by the clinical thermometer.

The results are as follows:

Total cultures taken, 82.

Of this number, 33 were sterile; 49 contained organisms of various kinds.

Streptococci occurred in 13 cultures. One thermometer which gave a pure culture of streptococci had been used in the mouth of a patient with facial erysipelas a few hours before and had been washed in water and dipped in alcohol before returning to the case. Five others, from thermometers used in scarlet-fever patients, contained streptococci in large numbers.

Staphylococcus albus and *citreus* were present in 13 cultures.

Pneumococcus occurred in one culture.

The remainder had various organisms, large spore-forming bacilli, hay-bacilli, mold fungus, etc.

To demonstrate that more than ordinary washing is required to render clinical thermometers free from secretions after using, the following experiments were made:

Six cultures were taken from thermometers directly after they were removed from the mouth, after first washing them in running water. Six cultures were taken from thermometers after removing them from the mouth, after first washing them in running water and then rubbing them off with 95 per cent alcohol. Of the first series of six, Nos. 1, 2, 3, 4, and 5 gave cultures of various organisms, including staphylococci and large spore-forming bacilli. No. 6 was sterile. Of the second series of six, only one gave any culture, the remaining five being sterile.

Five cultures were taken from thermometers after washing them thoroughly with running water with constant rubbing, and then washing them off thoroughly with sterile cotton wet with 95 per cent alcohol. All these were sterile.

Five cultures were taken from thermometers with a smooth surface (scale on the inside), which had been washed in running water with soap and then dried on a clean hand towel. Two of these gave cultures, one of *Staphylococcus albus*, the other of a large diplococcus.

From the foregoing experiments it is apparent that clinical thermometers are possible sources of infection and that some safer method of rendering them clean than is generally in vogue should be employed.

It has been demonstrated that careless washing will not suffice, but that thorough washing with running water and then alcohol will render them clean.

A thermometer case containing some solution such as alcohol or formalin, in which the thermometer could be carried, would lessen greatly the possibilities of infection, as several thermometers were examined which were carried in this way and all were sterile.

It must be remembered that returning a soiled thermometer to the ordinary case will result in infecting the case, so that it may be a constant source of contamination to the thermometer, no matter how carefully it may have been washed.—(R. C. R.)

TROPICAL MEDICINE.

E. R. STITT, Medical Director, United States Navy.

ROGERS, Sir LEONARD. Preliminary note on the intravenous injection of gynocardate of soda in leprosy. Brit. Med. Jour., October 21, 1916.

The author notes that he has been giving subcutaneously the soluble soaps of lower melting point fatty acids of chaulmoogra oil, which acids are rightly designated gynocardic acid. He has now found that the sodium salt can be given intravenously in large doses with safety to animals.

For intravenous use in man he prepares a 2 or 3 per cent solution in distilled water, and after sterilization in an autoclave, adds one-half per cent carbolic acid. The solution should be quite clear. He starts with one-tenth of a grain and increases the dosage by one-tenth with each successive injection up to four-fifths of a grain.

At the time of writing the article Sir Leonard has given about 200 intravenous injections of gynocardate and has substituted this method for the subcutaneous one. He believes that this method is as great an advance over the subcutaneous administration as is the latter over chaulmoogra oil by mouth.—(E. R. S.)

HURST, A. F. **Trench fever.** Lancet, London, October 14, 1916.

The author notes that the designation "trench fever" was adopted for the peculiar disease noted in the officers and men living near the trenches and in the personnel of hospitals. No cases occurred among ammunition columns, ordnance, and headquarters' troops. The disease has been prevalent in the forces in Flanders and among those serving in Saloniki.

Nothing is known as to the etiology of the disease, and owing to the fact that fatal cases do not occur, nothing is known as to the pathology of the disease. Injections of whole blood intravenously or intramuscularly into healthy soldiers brings about infection. An interesting point is that the injection of washed red corpuscles of those suffering from the disease brings about infection, while injections of plasma or serum fails to do so. One attack does not seem to confer immunity.

It is thought possible that the disease is trasmitted by an insect as there is no nasal, pharyngeal, or bronchial catarrh, and gastrointestinal symptoms are generally absent. Lice are thought to be the transmitting agents, and in one instance an officer developed the disease after allowing lice, taken from a patient sick with the disease, to bite him. The period of incubation is from 15 to 25 days.

The disease has an abrupt onset, with severe frontal and postorbital headache, followed by pains in the back and legs. There is no rash. The particular pain of the legs is a cutaneous hyperasthesia over the shins. There is a less degree of tenderness in the tendons back of the knee. Leukocytosis is frequent, but not invariable. There is often noted an increase in the large mononuclears.

Two types of the infection are recognized—the short form and the long form. In the former the temperature rapidly rises from 102° to 104°, falling rather suddenly on the third or fourth day to normal. The fever again rises after a short interval and remains elevated two or three days. The spleen is sometimes palpable. In the long type of the disease there are successions of febrile attacks with return of the pains for five or six relapses. These relapses follow after atypical intervals of from five to six days and usually only last about one day. The cases were at first diagnosed as influenza. In the cases of relapsing fever occurring in Saloniki the patients were extremely ill and often delirious during the pyrexial periods, and the periodicity with them was less marked than that observed in the long type of trench fever.

There is no treatment that seems to check the disease.

NOTE.—In the Lancet of October 7, 1916, Houston and McCloy have discussed the relation of the enterococcus to "trench fever." In this article they note that cases of trench fever show a sudden onset, with a temperature from 102° to 104°, and with an appearance not unlike the early stages of typhoid fever. The pulse compared with the temperature is slow. They consider these typhoid-like cases as belonging to a septicemic group which do not show the relapses of the types described in the article abstracted above. The enterococcus, they note, is a normal inhabitant of the bowel and differs from other streptococci chiefly in its greater powers of resistance and more ready growth on ordinary culture media.

In culturing the blood of this septicemic group of cases they have obtained the following results:

Sterile	85
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Bacillus: Nonlactose fermenter, not identified	1
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The authors have confirmed the work of the Japanese investigators (see note below) in cases of Weil's disease noted in soldiers stationed in the trenches.

The cases studied by Stokes and Ryle showed marked prostration, jaundice, and extreme injection of the conjunctivæ. The temperature at the onset is high, 103 to 105 F., and the febrile course is that of an irregular pyrexia falling by lysis. All cases show enlarged inguinal glands. The jaundice appears about the fourth day. Vomiting was noted in all cases. They injected guinea-pigs with blood from a case in the sixth day of the disease and brought about infection of the animals. The liver stained by the Levaditi method showed large numbers of spirochetes. The organisms were present in smaller numbers in the kidney.

NOTE.—Inada and others have shown that the epidemic jaundice of Japan (Weil's disease) is due to a spirochete infection. This spirochete, while resembling the treponemata morphologically, is a blood parasite rather than a tissue parasite and has been called *Spirocheta icterohemorrhagica.* These spirochetes are very scant in the blood of a patient and it is impracticable to search for them in blood, but by injecting the blood of a patient during the first week of the disease into guinea-pigs intraperitoneally, or administered orally, we produce conjunctival congestion, jaundice, hemorrhages, and albuminuria in the guinea-pig. The spirochetes are especially numerous in the liver of the infected animals. The rabbit is insusceptible.

The Japanese workers hold the view that the spirochetes are chiefly given off by the urine of patients with the disease. The method of infection is probably by mouth or through skin abrasions, or even through sound skin. The disease is chiefly noted in wet mines, and the spread ceases when these mines are pumped dry.

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PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY.

C. S. BUTLER, Surgeon, and R. H. LANING, Passed Assistant Surgeon, United States Navy.

WHERRY, W. B., and OLIVER, W. W. **Adaptation to certain tensions of oxygen as shown by gonococcus and other parasitic and saprophytic bacteria.** Jour. Infect. Dis., September, 1916.

The authors report that by the use of partial tensions of oxygen they have been enabled to cultivate organisms growing less well by other means. The gonococcus is especially considered. For its growth, they used slants of plus 0.5 Martin's medium containing sterile pleuritic fluid.

To obtain the partial tension of oxygen they attach to the inoculated slant, by means of a rubber tube, another slant on which was inoculated *B. subtilis*. They replaced the slant containing *B. subtilis*, from time to time, by freshly inoculated slants of *B. subtilis*.

For plating, they inoculated a large, deep plate with pus and inverted it over a smaller, shallow plate inoculated with *B. subtilis*. They sealed the plates to a pane of glass by plasticine.

The temperature of incubation was 37 C.—(G. F. CLARK.)

KENDALL, A. I., Professor of Bacteriology, Northwestern University. **Bacteriology, general, pathological, and intestinal.** Lea and Febiger, 1916.

Those who recall reading the numerous briefs in the BULLETIN of the pioneer researches of this indefatigable worker will surely be interested to learn that he has written a bacteriology more worthy of the title than any American work since that of the late General Sternberg. Terse, without superfluous pages, it is most entertainingly comprehensive, up to date without discoverable adoption of unaccepted modern views, it seems to comprise in 651 pages, all that any medical officer would require in a naval bacteriological laboratory.

The brief chapters on the chemistry and metabolism of bacteria are sufficient to indicate the direction which similar endeavors upon the part of others should take. The sections on the cycles of parasitism and pathogenism are unique and should serve well the epidemiologist.

The book fortunately contains the original plates of Flexner and Noguchi of the polymorphic organism now being definitely associated with poliomyelitis. The reviewer is not competent to judge of the completeness of the chapter on serology, but believes that utilized with Medical Director Stitt's works any medical officer will be happily equipped.—(C. N. FISKE.)

TAYLOR, K. **Gas gangrene—its course and treatment.** Bull. Johns Hopkins Hosp., October, 1916.

The condition is defined as "death of an extensive mass of muscle, due to the mechanical action of gas produced from a local focus by saprophytic bacteria." Carbohydrate-containing tissues (chiefly muscle) are those affected and *B. welchii* the excitant. These stages of gas-bacillus infection may be recognized. 1. Dormant. 2. Gaseous distention. 3. Systemic toxemia. It is against conditions arising in 1 and 2 that treatment must be directed. The factors concerned in the transition from stage 1 to stage 2 are discussed. (*a*) That we are dealing with several different organisms. This is not borne out by the facts. (*b*) Variation in virulence in strains of *B. welchii*, but no differences in virulence are demonstrable in animals. (*c*) Invasion of blood streams by *B. welchii*. A bacteriemia is not demonstrable during life. (*d*) Toxemia. Systemic effects from a limited focus are slight. Putrefactive and autolytic, colliquative necrosis produces profound toxic symptoms. The toxic principle really acts to convert healthy muscle into favorable medium for growth and gas production. (*e*) It has been suggested that certain individuals develop prompt immunity to infection while others do not. This is not borne out by facts. There is no phagocytosis of bacteria in wounds and no demonstrable antibodies. Animals recovered from one infection can be just as easily reinoculated. (*f*) Thrombosis and injury to blood vessels as a cause of rapid invasion of bacteria was not operative in the author's cases. Anemia of a part from ligature may hasten the extension in the same manner as gaseous distention. (*g*) The gas produced by *B. welchii* is nontoxic for guinea-pigs. (*h*) Symbiotic relation has perhaps nothing to do with the determination of malignancy.

In order for the dormant stage to pass into the gangrenous stage the author thinks two considerations necessary: (1) Continuous production of gas in the wound; (2) sustained gas pressure in a muscle mass.

Muscle lends itself to longitudinal infiltration with gas, the muscle sheath retaining the gas. Wounds which result in cutting portions of muscle from their blood supply and allow closure of drainage are most favorable. Treatment is considered under three subdivisions:

1. Prophylactic treatment during the dormant stage.
2. Treatment during the stage of gaseous distention.
3. Treatment of accomplished gangrene.

The following is the author's summary: The gas bacillus can be considered in its usual form as a pure saprophyte, and the occurrence of gas gangrene should be regarded as the result of the mechanical accident of gaseous distention. Like tetanus, it is a preventable disease. The bacillus resembles that of tetanus in its frequent occurrence in cultivated soil, its need for anærobic conditions which determine its saprophytic nature, and its need for a local focus of necrotic tissue in order to become a danger to its host. It differs from the tetanus bacillus in that with the latter the toxin is the active factor, whereas with the gas bacillus the mechanical action of the gas is the chief thing to be considered.

As in the case of tetanus, all fresh wounds should be considered as potentially malignant, and all available prophylactic measures should be applied routinely. He suggests the routine use of quinin dressings as perhaps more nearly specific than any other antiseptic. Its use is especially indicated during the first few days after injury. Special regard should be given to any factors which may compress the limb or interfere with free drainage of gas from the wound, particularly during the dangerous period of transportation.—(C. S. B.)

COWIE, D. M. **Observations on the intradermal and repeated intradermal injection of diphtheria toxin with reference to the Schick test.** Am. Jour. Dis. Child., September, 1916.

The conclusions the author draws from experiments and tests done on 81 persons are as follows:

Successive intradermal injections of very dilute solutions of diphtheria toxin (0.00001 mil L dose), when given at intervals varying from 5 to 12 days, provoke the formation of antibodies, and in those cases already exhibiting a certain degree of immunity bring about a definite immunity as recognized by the intradermal test.

An opinion of the degree of natural immunity may be obtained from the time of first appearance and from the character of the primary intradermal reaction. An early primary reaction of ordinary degree indicates absence, or low degree, of immunity. A late appearing primary reaction indicates that such a person has a greater degree of immunity than one who reacts early.

The development of immunity induced by means of infinitesimally small successive doses of diphtheria toxin may be recognized by a hastening in the time of the appearance of the reaction and a diminishing of the size of the lesion.

In those cases in which the size and intensity of the reaction was reduced by successive injections of toxin, the time of the appearance of the reaction was hastened in the large majority of cases observed. The greatest change toward a negative reaction occurred in those cases which gave a primary reaction on the third and fourth day.

A primary reaction case which does not change its character after a second, third, or fourth intradermal injection may be considered one without any reacting bodies, and, necessarily, one in which diphtheria would be easily induced.

The degree of immunity induced by such small doses of toxin as are represented by 0.1 mil of highly diluted diphtheria toxin seems to be very slight and can not be compared with the results obtained by the use of toxin-antitoxin mixtures. Solutions carrying sufficient toxin to induce immunity when given intradermally are not well borne by the patient.—(R. H. L.)

KOLMER, J. A., and MOSHAGE, E. L. **An anaphylactic skin reaction to diphtheria bacilli.** Am. Jour. Dis. Child., September, 1916.

From their studies the authors conclude as follows:

"1. Following the injection of diphtheria toxin in the conduct of the Schick test for antitoxic immunity in diphtheria, inflammatory reactions may be produced (1) by trauma and undue sensitiveness of the skin; the influence of these reactions may be minimized by injecting a minimum quantity of fluid (not over 0.1 mil); by using a stock toxin of high potency in order to require high dilution and the consequent injection of a minimum amount of the constituents of the broth, and by the employment of a proper technic (especially a small needle); (2) by an anaphylactic reaction to the protein of the diphtheria bacillus and to a lesser extent to the protein constituents of the broth itself, the former being more important; (3)

by the irritating effects of the toxin itself, constituting the true toxin reaction of Schick.

"2. An anaphylactic skin reaction to the protein of the diphtheria bacillus was observed in about 70 per cent of children and 35 per cent of adults following the intracutaneous injection of a polyvalent antigen of washed, neutralized, and heat-killed diphtheria bacilli (diphtherin).

"3. These reactions were regarded as anaphylactic in character and therefore entirely distinct from the true toxin reaction of Schick.

"4. The percentage of positive diphtherin reactions was higher than the anaphylactic reactions observed with the toxin of the Schick test due to a higher amount of protein being injected.

"5. About 53 per cent of persons of various ages yielded positive diphtherin and negative toxin (Schick) reactions. About 10 per cent yielded negative diphtherin and positive toxin reactions, both tests agreeing, therefore, in about 63 per cent of persons; 12.5 per cent reacted positively and 24.1 per cent negatively to both tests.

"6. The percentage of positive diphtherin reactions was slightly greater among those who were convalescent from diphtheria.

"7. There is no relation between the occurrence of positive and negative diphtherin and toxin reactions and the presence or absence of diphtheria bacilli in the upper air passages. A negative toxin reaction (Schick) in a person presenting clinical evidences of infection indicates that the individual does not require antitoxin, but nothing more; he may be infected with virulent diphtheria bacilli capable of disseminating the disease.

"8. While the diphtherin test indicates hypersensitiveness to the protein of the diphtheria bacillus, it has probably no value as an index of immunity and is of practical interest mainly from the viewpoint that the anaphylactic reaction may be mistaken for a positive Schick reaction."—(R. H. L.)

HENRICI, A. T. **The specificity of streptococci.** Jour. Infect. Dis., October, 1916.

The author starts out with a history of the experimental work done on various strains of streptococci. He goes on to state that "the purpose of the work here reported has been to demonstrate by experimental means what relationship, if any, exists between the various biochemical characters of streptococci (hemolytic power and carbohydrate-fermentation reactions) on the one hand, and virulence, elective organ affinities, and the character of the exudate produced on the other." The summary and conclusions are as follows: Fifty-three strains of streptococci from various sources were inoculated into 225 rabbits, and the virulence and elective organ affinities were compared with the power of hemolysis and carbohydrate fermentation.

The carbohydrate tests are of no significance from the standpoint of virulence, and of slight or doubtful significance from the standpoint of tissue localization.

The hemolytic streptococci are more virulent than the nonhemolytic, but the two classes localize in the same tissues with equal frequency.

One is not justified, from evidence obtained by rabbit-inoculation experiments, in recognizing any particular class of streptococci as specific for rheumatic fever, since the various rheumatic lesions, arthritis, myocarditis, endocarditis, and myositis, may be produced by some strains in each of the varieties, and are produced in equal proportion by both hemolytic and nonhemolytic streptococci.

Streptococci of various kinds may produce in rabbits types of myocarditis which can not be differentiated from the Aschoff-Geipel nodules generally considered diagnostic of rheumatism.

Experimental streptococcal endocarditis usually develops by implantation rather than by embolism.—(R. H. L.)

CHEMISTRY AND PHARMACY.

E. W. BROWN, Passed Assistant Surgeon, and O. G. RUGE, Chief Pharmacist, United States Navy.

LANG, R. M. **Acidosis and some of the factors which influence it.** Biochem. Jour., ix, No. 4, pp. 456–478.

A number of feeding experiments in which the author himself was the subject are reported. Acidosis in starvation and the influence of the nature of the diet, as well as the specific effects of feeding protein, fat, and carbohydrate, were the factors studied. The following conclusions are drawn:

"The quantity of acetone bodies excreted by the normal individual, on an ordinary diet containing a sufficiency of carbohydrate, is influenced chiefly by the protein intake. On an ordinary diet from 10 to 30 mg. are excreted daily.

"The administration of quite small amounts of carbohydrate to the starving organism brings about a great reduction in the acidosis. The administration of protein to the fasting organism causes a similar decrease, but this is neither so marked nor so rapid as in the case of carbohydrate. The administration of glycerol under similar conditions also causes a very definite reduction in the acidosis. The administration of fat to the starving organism increases the acidosis. Administration of alcohol is without effect on the degree of acidosis.

"The amount of acetone bodies in the urine during the first few days of starvation depends on the initial carbohydrate storage.

wholesome when eaten in quantity. In the digestion experiments the average weight of protein supplied by the meat exceeded that generally furnished by the meat portion of the ordinary diet, indicating that very young or bob veal was not distasteful. The experiments here reported also indicate that the general opinion that young veal is a common cause of digestive disturbance or fails to digest as thoroughly as similar foods is not justified.—(R. C. R.)

RAMSEY, W. R., and SCHOBERG, H. M. **Report of eighty-two cultures taken from physicians' clinical thermometers.** Wisconsin Med. Jour., xv, No. 3, August, 1916.

The authors made some commendable investigations of the but too prevalent carelessness as regards carrying of contagion by the clinical thermometer.

The results are as follows:

Total cultures taken, 82.

Of this number, 33 were sterile; 49 contained organisms of various kinds.

Streptococci occurred in 13 cultures. One thermometer which gave a pure culture of streptococci had been used in the mouth of a patient with facial erysipelas a few hours before and had been washed in water and dipped in alcohol before returning to the case. Five others, from thermometers used in scarlet-fever patients, contained streptococci in large numbers.

Staphylococcus albus and *citreus* were present in 13 cultures.

Pneumococcus occurred in one culture.

The remainder had various organisms, large spore-forming bacilli, hay-bacilli, mold fungus, etc.

To demonstrate that more than ordinary washing is required to render clinical thermometers free from secretions after using, the following experiments were made:

Six cultures were taken from thermometers directly after they were removed from the mouth, after first washing them in running water. Six cultures were taken from thermometers after removing them from the mouth, after first washing them in running water and then rubbing them off with 95 per cent alcohol. Of the first series of six, Nos. 1, 2, 3, 4, and 5 gave cultures of various organisms, including staphylococci and large spore-forming bacilli. No. 6 was sterile. Of the second series of six, only one gave any culture, the remaining five being sterile.

Five cultures were taken from thermometers after washing them thoroughly with running water with constant rubbing, and then washing them off thoroughly with sterile cotton wet with 95 per cent alcohol. All these were sterile.

Five cultures were taken from thermometers with a smooth surface (scale on the inside), which had been washed in running water with soap and then dried on a clean hand towel. Two of these gave cultures, one of *Staphylococcus albus*, the other of a large diplococcus.

From the foregoing experiments it is apparent that clinical thermometers are possible sources of infection and that some safer method of rendering them clean than is generally in vogue should be employed.

It has been demonstrated that careless washing will not suffice, but that thorough washing with running water and then alcohol will render them clean.

A thermometer case containing some solution such as alcohol or formalin, in which the thermometer could be carried, would lessen greatly the possibilities of infection, as several thermometers were examined which were carried in this way and all were sterile.

It must be remembered that returning a soiled thermometer to the ordinary case will result in infecting the case, so that it may be a constant source of contamination to the thermometer, no matter how carefully it may have been washed.—(R. C. R.)

TROPICAL MEDICINE.

E. R. STITT, Medical Director, United States Navy.

ROGERS, Sir LEONARD. **Preliminary note on the intravenous injection of gynocardate of soda in leprosy.** Brit. Med. Jour., October 21, 1916.

The author notes that he has been giving subcutaneously the soluble soaps of lower melting point fatty acids of chaulmoogra oil, which acids are rightly designated gynocardic acid. He has now found that the sodium salt can be given intravenously in large doses with safety to animals.

For intravenous use in man he prepares a 2 or 3 per cent solution in distilled water, and after sterilization in an autoclave, adds one-half per cent carbolic acid. The solution should be quite clear. He starts with one-tenth of a grain and increases the dosage by one-tenth with each successive injection up to four-fifths of a grain.

At the time of writing the article Sir Leonard has given about 200 intravenous injections of gynocardate and has substituted this method for the subcutaneous one. He believes that this method is as great an advance over the subcutaneous administration as is the latter over chaulmoogra oil by mouth.—(E. R. S.)

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TAYLOR, K. **Gas gangrene—its course and treatment.** Bull. Johns Hopkins Hosp., October, 1916.

The condition is defined as "death of an extensive mass of muscle, due to the mechanical action of gas produced from a local focus by saprophytic bacteria." Carbohydrate-containing tissues (chiefly muscle) are those affected and *B. welchii* the excitant. These stages of gas-bacillus infection may be recognized. 1. Dormant. 2. Gaseous distention. 3. Systemic toxemia. It is against conditions arising in 1 and 2 that treatment must be directed. The factors concerned in the transition from stage 1 to stage 2 are discussed. (*a*) That we are dealing with several different organisms. This is not borne out by the facts. (*b*) Variation in virulence in strains of *B. welchii*, but no differences in virulence are demonstrable in animals. (*c*) Invasion of blood streams by *B. welchii*. A bacteriemia is not demonstrable during life. (*d*) Toxemia. Systemic effects from a limited focus are slight. Putrefactive and autolytic, colliquative necrosis produces profound toxic symptoms. The toxic principle really acts to convert healthy muscle into favorable medium for growth and gas production. (*e*) It has been suggested that certain individuals develop prompt immunity to infection while others do not. This is not borne out by facts. There is no phagocytosis of bacteria in wounds and no demonstrable antibodies. Animals recovered from one infection can be just as easily reinoculated. (*f*) Thrombosis and injury to blood vessels as a cause of rapid invasion of bacteria was not operative in the author's cases. Anemia of a part from ligature may hasten the extension in the same manner as gaseous distention. (*g*) The gas produced by *B. welchii* is nontoxic for guinea-pigs. (*h*) Symbiotic relation has perhaps nothing to do with the determination of malignancy.

In order for the dormant stage to pass into the gangrenous stage the author thinks two considerations necessary: (1) Continuous production of gas in the wound; (2) sustained gas pressure in a muscle mass.

Muscle lends itself to longitudinal infiltration with gas, the muscle sheath retaining the gas. Wounds which result in cutting portions of muscle from their blood supply and allow closure of drainage are most favorable. Treatment is considered under three subdivisions:

1. Prophylactic treatment during the dormant stage.
2. Treatment during the stage of gaseous distention.
3. Treatment of accomplished gangrene.

The following is the author's summary: The gas bacillus can be considered in its usual form as a pure saprophyte, and the occurrence of gas gangrene should be regarded as the result of the mechanical accident of gaseous distention. Like tetanus, it is a preventable disease. The bacillus resembles that of tetanus in its frequent occurrence in cultivated soil, its need for anærobic conditions which determine its saprophytic nature, and its need for a local focus of necrotic tissue in order to become a danger to its host. It differs from the tetanus bacillus in that with the latter the toxin is the active factor, whereas with the gas bacillus the mechanical action of the gas is the chief thing to be considered.

As in the case of tetanus, all fresh wounds should be considered as potentially malignant, and all available prophylactic measures should be applied routinely. He suggests the routine use of quinin dressings as perhaps more nearly specific than any other antiseptic. Its use is especially indicated during the first few days after injury. Special regard should be given to any factors which may compress the limb or interfere with free drainage of gas from the wound, particularly during the dangerous period of transportation.—(C. S. B.)

COWIE, D. M. **Observations on the intradermal and repeated intradermal injection of diphtheria toxin with reference to the Schick test.** Am. Jour. Dis. Child., September, 1916.

The conclusions the author draws from experiments and tests done on 81 persons are as follows:

Successive intradermal injections of very dilute solutions of diphtheria toxin (0.00001 mil L dose), when given at intervals varying from 5 to 12 days, provoke the formation of antibodies, and in those cases already exhibiting a certain degree of immunity bring about a definite immunity as recognized by the intradermal test.

An opinion of the degree of natural immunity may be obtained from the time of first appearance and from the character of the primary intradermal reaction. An early primary reaction of ordinary degree indicates absence, or low degree, of immunity. A late appearing primary reaction indicates that such a person has a greater degree of immunity than one who reacts early.

The development of immunity induced by means of infinitesimally small successive doses of diphtheria toxin may be recognized by a hastening in the time of the appearance of the reaction and a diminishing of the size of the lesion.

In those cases in which the size and intensity of the reaction was reduced by successive injections of toxin, the time of the appearance of the reaction was hastened in the large majority of cases observed. The greatest change toward a negative reaction occurred in those cases which gave a primary reaction on the third and fourth day.

A primary reaction case which does not change its character after a second, third, or fourth intradermal injection may be considered one without any reacting bodies, and, necessarily, one in which diphtheria would be easily induced.

The degree of immunity induced by such small doses of toxin as are represented by 0.1 mil of highly diluted diphtheria toxin seems to be very slight and can not be compared with the results obtained by the use of toxin-antitoxin mixtures. Solutions carrying sufficient toxin to induce immunity when given intradermally are not well borne by the patient.—(R. H. L.)

KOLMER, J. A., and MOSHAGE, E. L. **An anaphylactic skin reaction to diphtheria bacilli.** Am. Jour. Dis. Child., September, 1916.

From their studies the authors conclude as follows:

"1. Following the injection of diphtheria toxin in the conduct of the Schick test for antitoxic immunity in diphtheria, inflammatory reactions may be produced (1) by trauma and undue sensitiveness of the skin; the influence of these reactions may be minimized by injecting a minimum quantity of fluid (not over 0.1 mil); by using a stock toxin of high potency in order to require high dilution and the consequent injection of a minimum amount of the constituents of the broth, and by the employment of a proper technic (especially a small needle); (2) by an anaphylactic reaction to the protein of the diphtheria bacillus and to a lesser extent to the protein constituents of the broth itself, the former being more important; (3)

by the irritating effects of the toxin itself, constituting the true toxin reaction of Schick.

"2. An anaphylactic skin reaction to the protein of the diphtheria bacillus was observed in about 70 per cent of children and 35 per cent of adults following the intracutaneous injection of a polyvalent antigen of washed, neutralized, and heat-killed diphtheria bacilli (diphtherin).

"3. These reactions were regarded as anaphylactic in character and therefore entirely distinct from the true toxin reaction of Schick.

"4. The percentage of positive diphtherin reactions was higher than the anaphylactic reactions observed with the toxin of the Schick test due to a higher amount of protein being injected.

"5. About 53 per cent of persons of various ages yielded positive diphtherin and negative toxin (Schick) reactions. About 10 per cent yielded negative diphtherin and positive toxin reactions, both tests agreeing, therefore, in about 63 per cent of persons; 12.5 per cent reacted positively and 24.1 per cent negatively to both tests.

"6. The percentage of positive diphtherin reactions was slightly greater among those who were convalescent from diphtheria.

"7. There is no relation between the occurrence of positive and negative diphtherin and toxin reactions and the presence or absence of diphtheria bacilli in the upper air passages. A negative toxin reaction (Schick) in a person presenting clinical evidences of infection indicates that the individual does not require antitoxin, but nothing more; he may be infected with virulent diphtheria bacilli capable of disseminating the disease.

"8. While the diphtherin test indicates hypersensitiveness to the protein of the diphtheria bacillus, it has probably no value as an index of immunity and is of practical interest mainly from the viewpoint that the anaphylactic reaction may be mistaken for a positive Schick reaction."—(R. H. L.)

HENRICI, A. T. **The specificity of streptococci.** Jour. Infect. Dis., October, 1916.

The author starts out with a history of the experimental work done on various strains of streptococci. He goes on to state that "the purpose of the work here reported has been to demonstrate by experimental means what relationship, if any, exists between the various biochemical characters of streptococci (hemolytic power and carbohydrate-fermentation reactions) on the one hand, and virulence, elective organ affinities, and the character of the exudate produced on the other." The summary and conclusions are as follows: Fifty-three strains of streptococci from various sources were inoculated into 225 rabbits, and the virulence and elective organ affinities were compared with the power of hemolysis and carbohydrate fermentation.

The carbohydrate tests are of no significance from the standpoint of virulence, and of slight or doubtful significance from the standpoint of tissue localization.

The hemolytic streptococci are more virulent than the nonhemolytic, but the two classes localize in the same tissues with equal frequency.

One is not justified, from evidence obtained by rabbit-inoculation experiments, in recognizing any particular class of streptococci as specific for rheumatic fever, since the various rheumatic lesions, arthritis, myocarditis, endocarditis, and myositis, may be produced by some strains in each of the varieties, and are produced in equal proportion by both hemolytic and nonhemolytic streptococci.

Streptococci of various kinds may produce in rabbits types of myocarditis which can not be differentiated from the Aschoff-Geipel nodules generally considered diagnostic of rheumatism.

Experimental streptococcal endocarditis usually develops by implantation rather than by embolism.—(R. H. L.)

CHEMISTRY AND PHARMACY.

E. W. BROWN, Passed Assistant Surgeon, and O. G. RUGE, Chief Pharmacist, United States Navy.

LANG, R. M. **Acidosis and some of the factors which influence it.** Biochem. Jour., ix, No. 4, pp. 456–478.

A number of feeding experiments in which the author himself was the subject are reported. Acidosis in starvation and the influence of the nature of the diet, as well as the specific effects of feeding protein, fat, and carbohydrate, were the factors studied. The following conclusions are drawn:

"The quantity of acetone bodies excreted by the normal individual, on an ordinary diet containing a sufficiency of carbohydrate, is influenced chiefly by the protein intake. On an ordinary diet from 10 to 30 mg. are excreted daily.

"The administration of quite small amounts of carbohydrate to the starving organism brings about a great reduction in the acidosis. The administration of protein to the fasting organism causes a similar decrease, but this is neither so marked nor so rapid as in the case of carbohydrate. The administration of glycerol under similar conditions also causes a very definite reduction in the acidosis. The administration of fat to the starving organism increases the acidosis. Administration of alcohol is without effect on the degree of acidosis.

"The amount of acetone bodies in the urine during the first few days of starvation depends on the initial carbohydrate storage.

These substances appear in abnormal amounts immediately the ratio of the fat to the carbohydrate burnt becomes greater than about 2:1. Immediately the ratio becomes less than this the acetone output is reduced to normal.

"While a relatively large amount of carbohydrate is required to prevent acidosis, quite a small amount suffices to check it very markedly.

"When acetone bodies are excreted in excessive amounts they are for the most part derived from fat. Some evidence is put forward in favor of the possibility of fat being converted into carbohydrate in the body."—(E. W. B.)

McLEAN, F. C., and VAN SLYKE, D. D. **A method for the determination of chlorids in small amounts of body fluids.** Jour. Biol. Chem., xxi, No. 2, pp. 361–370.

The method was devised for using quantities of material as small as 0.5 mil and to obtain an accuracy of 1 part per 100. The determination requires two steps: (1) Removal of proteins and (2) titration of chlorids.

The proteins may be removed by coagulation or by ignition, the results being identical by both methods. Coagulation is, however, simpler in routine work. After removal of the proteins "the chlorids are precipitated in the presence of nitric acid by standard silver nitrate solution, the silver chlorid is removed by filtration, and the excess silver titrated with standard potassium iodid. The titration is performed in the presence of nitrous acid and starch, so that the first drop of iodid in excess of the silver present is changed to free iodin and gives the blue starch-iodin color. The optimum acidity for the end point is fixed by the addition of trisodium citrate in amount equivalent to the free nitric acid present. Under these conditions one drop of excess fiftieth-normal iodid gives a color perceptible in 150 mils of solution."—(E. W. B.)

JOLLES, A. **New indican reaction.** Ztschr. f. physiol. Chem., xcv, No. 1, pp. 29–33.

The following procedure is recommended as a qualitative test for indican: 10 mils of urine are mixed with 1 mil of a 5 per cent alcoholic solution of naphthol and 10 mils concentrated hydrochloric acid (containing 5 gm. ferric chlorid per liter). The mixture is thoroughly shaken and allowed to set for 15 minutes, after which the coloring matter is extracted with 5 mils of chloroform. The color of the extract will vary from violet to a dark blue, depending on the amount of indican present. The reaction is sensitive to 0.003 mg.

indican in 10 mils of liquid, but is not applicable to quantitative colorimetric determination.—(E. W. B.)

HASKINS, H. D. **The uric acid solvent power of urine containing hexamethylenamin (urotropin) as compared with that of normal urine.** Arch. Int. Med., xvi, No. 6. pp. 1055–1067.

It has been known for a long time that urotropin in aqueous solutions dissolves considerable uric acid; 66 mg. are taken up by 100 mils of a 0.25 per cent solution. The solubility of uric acid in distilled water under the same conditions is about 8.4 mg. From such findings it is easy to understand how the claim could be made that urotropin exerts a marked solvent action. It is emphasized, however, that such concentrations are greater than can occur in the urine after giving therapeutic doses.

Many urines containing urotropin possess no power to take up uric acid in addition to that already present, while, on the other hand, many do show a marked solvent power.

The investigation reported in this paper has shown that those urotropin urines with a distinct uric acid solvent capacity are the ones which have the same acidity reaction as those normal urines that have the ability to dissolve uric acid in appreciable quantity.

It therefore became necessary to make an extended study of the action of normal urines in dissolving uric acid and then to compare the results with those obtained with urines containing the drug.

(1) Dilute and less dilute urines of normal persons containing urotropin compared with normal urines with urotropin present; (2) very dilute, dilute, and less dilute urines of hospital patients compared; (3) urines of normal persons after excessive doses of urotropin compared with controls without the drug; (4) effect of adding urotropin to normal urines; (5) solvent action of urotropin with phosphate solutions added to the urine.

The author concludes that the present research has in all probability settled the question of the uric acid solvent power of urotropin. The conclusions follow: (1) In the case of urine, urotropin exerts a uric acid solvent action only after the administration of such excessive doses as 4 grams. Therapeutic doses had practically no influence. (2) Alkaline diuretics impart to the urine as great solvent power as these excess doses of urotropin.—(E. W. B.)

NAGASAKI, S. **The determination of small amounts of sugar in urine.** Ztschr. f. physiol. Chem., xcv, No. 2–3, pp. 61–77.

For determining small amounts of sugar in urine the author has devised a method as follows: The sample is first titrated with Benedict's copper solution. Another sample is then inoculated with the yeast *Torula monosa* and allowed to ferment for 24 hours at 30 C. After the fermentation the sample is again titrated with Benedict's solution and the amount of glucose calculated from the difference in the two titrations. By boiling the fermented urine with citric acid and repeating the fermentation and titrations as before, the isomaltose, calculated as glucose, can be easily determined. Samples in which spontaneous fermentation has started do not give reliable results.

The method is deemed of value in determining the slight influence of a diet in case of glycosuria and in making a diagnosis of doubtful cases of diabetes. The average glucose content of 174 samples of normal urine was found to be 0.012 per cent (maximum 0.033, minimum 0.002 per cent), and the average percentage of isomaltose in 84 samples was found to be 0.012 per cent (maximum 0.023, minimum 0.003 per cent).—(E. W. B.)

BONNEMA, A. A. **A simple method for the determination of ammonia in urine.** Chem.-Ztg., xxxix, No. 82–83, p. 519.

The method devised is as follows: To 10 mils of the urine in a 300-mil Erlenmeyer flask 30 mils of absolute alcohol are added, together with several small pieces of pumice stone and 0.5 gm. of unslaked lime. The flask is fitted with an adapter, to which is attached a condenser by a piece of rubber tubing. The flask is heated with constant shaking over a free flame and the distillate received in a 50-mil graduate containing 10 mils of tenth-normal sulphuric acid. When the liquid in the graduate measures 40 mils the distillation is stopped. The contents of the graduate are transferred to a flask, about 75 mils of distilled water added, and the excess acid titrated with tenth-normal alkali, using 1 per cent nitrophenol or other indicator suitable for ammonia titrations. Claims made for the method are (1) that ammonia does not exist as ammonium hydroxid in alcoholic solution, and hence distills over completely; (2) the distillate always consists of a mixture of water and alcohol, as does the residue in the flask; and (3) urea can not take up water in alcoholic solution and thus form ammonium carbonate.

The formol titration method of Henriques and Sorensen has been slightly modified for the determination of amino-acids in urine.—(E. W. B.)

EYE, EAR, NOSE, AND THROAT.

E. J. GROW, Surgeon, and G. B. TRIBLE, Passed Assistant Surgeon, United States Navy.

CORDS, R. **The value of the conjunctival covering in war.** München. med. Wchnschr., lxii, p. 1196.

Cords has seen this value in many cases on which he had to operate because of injury to the cornea. Most of his 34 cases were of more or less gaping wounds, in which simple abscission of the prolapse of iris gave a particularly bad prognosis. He used the conjunctival covering even in desperate cases and had the opportunity to see that eyes which had lost the power to distinguish light from dark regain this power gradually. In all cataract operations he used this covering as a prophylactic, as he has to operate in the same operating room in which badly infected wounds are treated, and has had recovery without reaction in all extractions of wounded lenses. Of 34 eyes he saved useful vision in 13, and a trace of vision in 9. He ascribes to the conjunctival covering mainly the fact that he was able to save the sight in such a comparatively large number of these serious wounds, because it protects against both secondary infections and sympathetic inflammation and contributes materially to a more rapid and more solid cicatrization.—(E. J. G.)

LÖWENSTEIN, E., and HERRMAN. **Studies of a specific treatment for trachoma.** Deutsch. med. Wchnschr., xli, No. 35, p. 1062.

The authors obtained an antigen by expressing trachoma granules, triturating them in physiological salt solution in a porcelain mortar, and then made a subcutaneous injection. This produced no reaction. The first favorable influence appeared some 8 or 10 days after the injection. The infiltration of the conjunctiva decreased, and in pannus there was a slower atrophy of the gelatinous deposits and a clearing up of the cornea. The result in the three cases that had been treated was good; in one the vision had been improved remarkably, from perception of light to counting fingers at 4 meters.—(E. J. G.)

HASELBERG, A. **Treatment of corneal ulcer with lactic acid.** Wchnschr. f. Therap. u. Hyg. d. Auges, 1915, No. 25.

Haselberg recommends the application of lactic acid, either pure or in a 50 per cent dilution, to serpiginous ulcers. A slender probe is dipped in the acid, then shaken until only a trace of the fluid can be seen on its end, applied for 5 or 10 seconds to the base of the ulcer and the undermined portions of its margin, and then washed off with salt solution. Previous cocainization of the eye is necessary. Almost always the ulcer comes to a standstill, so that a second application is needed in only a few cases. The scar is very delicate and superficial.—(E. J. G.)

GUTTMAN, J. **A new method of opening the drum membrane in purulent otitis media by means of a trephine.** Laryngoscope, xxvi, No. 7.

The narrow slit in the drum membrane made by the very thin needle or knife will in some cases close in a few hours. To improve the drainage the author advocates the following procedure: The ear canal is cleansed with peroxid of hydrogen and alcohol. In very sensitive patients or children use a general anesthetic, otherwise local. Then penetrate the drum with a trephine. This trephine is a hollow steel barrel 4 inches long, the upper end of which is surrounded to the extent of 1 inch by a thicker furrowed steel mantel as a handle. Trephining is always done in the lower posterior quadrant, because drainage is always better the lower the opening.—(G. B. T.)

SMITH, E. T. **A bloodless method of enucleating tonsils.** Laryngoscope, xxvi, No. 2.

Under gas-oxygen-ether anesthesia, given through the Davis-Crowe mouth gag, the patient is placed in the recumbent position with the head slightly lower than the rest of the body. A suction apparatus is used to receive blood and mucus from the throat, and bleeding is controlled by simple pressure in a vast majority of cases. A routine physical examination is made, including urine analysis and the coagulation point of the blood. Morphin gr. $\frac{1}{6}$ and atropin gr. $\frac{1}{150}$ are given hypodermically 20 minutes before the operation. The operation is divided into six steps. First step: The tonsil is grasped by forceps and drawn from its bed out into the throat; an incision is made through the plica, extending from the middle of the anterior surface of the tonsil to the base of the tongue, care being exercised not to injure the capsule. Another incision is made from the beginning of the first, up over the tonsil and down its posterior surface, care being taken not to injure the pillar. Second step: The tonsil is separated from the anterior pillar and upper part of the posterior pillar by means of the Carter knife. Third step: The anterior pillar is retracted by a Hurd's retractor, the tonsil everted, traction applied, and the tonsil dissected by blunt dissection from the sinus tonsillaris. Fourth step: Application of snare (Beck-Schenck-Borden tonsillectome) to base, with removal of tonsil. Fifth step: Pressure is made by a sponge wet with $\frac{1}{1000}$ adrenalin solution. Sixth step: Retraction of the pillars and inspection of the sinus tonsillaris for evidence of hemorrhage or remains of the tonsil.

After-treatment, alkaline mouth wash, application of 5 per cent silver nitrate solution to the bed of the tonsil.—(G. B. T.)

COCKS, G. H., and DWYER, J. G. **Final report on the isolation and cultivation of the tubercle bacillus from the discharging ear in cases of chronic purulent otitis media.** Jour. Laryngol., Rhinol., and Otol., xxxi, No. 7.

The former technic was as follows: Collect the aural discharge in a wide-mouthed bottle, saturate immediately with sodium chlorid, and allow it to stand one-half to one hour. The bacteria are found floating on the surface. Collect this film in a deflagration spoon in a wide-mouthed bottle, add an equal part of normal sodium hydroxid. The mixture is shaken well, left for digestion in an incubator at 37 C. for one to two hours, shaking it every half hour. Neutralize with normal hydrochloric acid and inoculate in test tubes. Growth occurs in from 15 to 30 days. This method differs a little from Petroff's, but uses Petroff's medium.

At present the technic has been slightly modified, and a solution of 3 per cent sodium hydroxid is used to wash the discharge from the ear or mastoid wound. This discharge is allowed to stand in a sterile flask in an incubator from one to three hours, being shaken at intervals. When the flakes of mucus have been dissolved the mixture is centrifugal and the supernatant fluid poured off. The precipitate is neutralized with normal hydrochloric acid, using litmus as an indicator. The residue is then inoculated into a series (10) of Miller's culture medium. The base of this medium is the extract of the glands, spleen, and lymphatic tissue of laboratory animals. Growth takes place in from 10 to 20 days, much more quickly than when the original Petroff medium is employed. Subcultures are then made.

Among 32 cases, 5 were tuberculous.—(G. B. T.)

KYLE, J. J. **Epidemic nasal sinus disease.** Jour. Laryngol., Rhinol., and Otol., xxxi, No. 9.

An epidemic of infectious disease of the nasal and lower air passages spread from coast to coast during the past winter.

The general symptoms were very much the same, but the causative organism varies. Pus ordinarily does not always form in the sinuses. As a rule the mucous discharge from the nose contains the same organisms as found in the sinuses.

Indiscriminate expectorating in public places is, in the author's opinion, a very active cause of the spread of these conditions.

In 32 unselected cases of ethmoid suppuration, the following organisms were found, i. e., *Bacillus coli*, mixed with the diphtheroid and staphylococcus, 2; staphylococcus 11; *streptococcus pyogenes* 2; pneumococcus 1; Friedländer's 6; *Bacillus pyocyaneus* 8; *Micrococcus catarrhalis* 2; *Bacillus prodigiosus* 1.

In a few cases an organism resembling the bacillus of Perez was found.

Stock and autogenous vaccines were used, but were not satisfactory.—(G. B. T.)

REPORTS.

A BRIEF REPORT OF THE ACTIVITIES OF THE FIELD HOSPITAL, FIRST BRIGADE, UNITED STATES MARINE CORPS, PORT AU PRINCE, HAITI, SEPTEMBER 4, 1915, TO SEPTEMBER 20, 1916.

By R. B. WILLIAMS, Surgeon, United States Navy.

A landing force was put ashore from the U. S. S. *Washington* at Port au Prince, Haiti, July 31, 1915. On August 6, 1915, a regiment of marines arrived in Haiti, on board the *Connecticut*, and on August 16, 1916, a second regiment arrived on the *Tennessee*. A field hospital was established at 14 Avenue Charles Sumner, its present location, on September 4, 1915, by Passed Asst. Surgeon G. L. Wickes, the brigade surgeon.

The hospital consists of a native brick dwelling, containing five large and three small rooms, with a balcony on three sides of the lower floor. In the rear of the building there is a large yard extending back to a ravine, a distance of 200 yards or more. In this yard a storeroom and other outbuildings have furnished satisfactory storerooms for medical supplies.

The larger rooms in the main building have been used as wards; the small room on the second floor has been fitted up as a laboratory; one of the two smaller rooms on the first floor has been converted into a very satisfactory operating room, and the other into a dispensary. On the balcony 14 beds were placed, and a part of the balcony containing 4 beds was set aside for sick officers.

In the yard 22 tents were set up, 8 of the large or hospital variety and 14 of the smaller tents. The members of the Hospital Corps are quartered in the smaller tents and the hospital tents are used for venereal and convalescent patients. The facilities thus provided furnished accommodations for 80 patients.

The number of admissions, discharges, sick days, and disposition of the cases are shown in the following table:

Total number of admissions	663
Total number of sick days	15, 348
Total number discharged to duty	547
Total number transferred to U. S. S. *Solace*	18
Total number transferred to a naval hospital in the United States	54
Transferred to sick leave	2
Died	2
Remaining Sept. 20, 1916	40
Largest number of patients at any one time	78

A large proportion of the total sick days have been caused by two diseases—malaria and syphilis. For malaria there have been 235 admissions (65 original admissions and 170 readmissions), with a total of 3,650 sick days, and for syphilis 175 admissions (53 original admissions and 104 readmissions), with a total of 3,625 sick days. The third most important disease as a cause of disability is chancroid of lymph node (chancroidal bubo) with 46 admissions and 1,416 sick days.

The following report shows the nature and amount of work done in the laboratory since September 4, 1915:

Blood examined for malaria		816
Subtertian	214	
Simple tertian	58	
Quartan	2	
Negative	542	
Blood counts, red		86
Lowest red count (blackwater fever) 1,390,000 (hemoglobin 40 per cent).		
Next lowest (ulcer of stomach) 2,760,000 (hemoglobin 50 per cent).		
Blood counts, white		117
Blood counts, differential		54
Hemoglobin estimations		99
Examination of smears from venereal sores		43
Treponema pallidum demonstrated	13	
Treponema pallidum not demonstrated	31	
Examination of urethral smears		40
Gonococcus demonstrated	35	
Gonococcus not demonstrated	5	
Examination of sputum		128
Tubercle bacilli demonstrated	10	
Tubercle bacilli not demonstrated	118	
Examination of feces		125
Blood, pus, mucus, and fat globules	53	
Hookworm	9	
Endameba coli	1	
Ameba	1	
No findings or normal	61	
Examinations of urine		410

The following is a list of operations performed since the hospital was opened:

Operation.	General anesthetic.	Local anesthetic.
Adenectomy:		
Double, venereal	4	
Single, venereal	13	43
Double, nonvenereal		2
Single, nonvenereal	7	27
Bubo incised:		
Venereal		14
Nonvenereal		11
Hemorrhoids	2	1
Abscess of penis		1
Resection of rib	1	
Excision of ingrowing nails		5
Appendectomy	10	
Varicocele	2	
Hernia, inguinal	2	
Tonsillectomy		1
Abscess of liver	1	
Abscess of arm		1
Gunshot wound, dressed and cleaned	3	2
Varix of leg	1	
Redundant prepuce		3
Paraphimosis		4
Hydrocele	2	
Total	48	115
Neosalvarsan intravenously		260
Quinin intravenously		60+

Referring to the laboratory report it will be seen that there have been 214 cases of subtertian malaria and 58 cases of simple tertian, giving a proportion of approximately 4 of the the subtertian to 1 of the simple tertian. This proportion probably holds good at the other stations as well as at Port au Prince.

Except in a few instances the cases of malaria that we have encountered at the field hospital have not assumed a malignant or dangerous form. There have been no deaths from malaria at the hospital and only two deaths among the personnel of the brigade which can be directly attributed to malaria alone.

Subtertian malaria has appeared in a cerebral form, a bilious remittent form, and in a form characterized by great depression after the second or third paroxysm, if such occurs.

We have found that subtertian malaria in a first attack frequently begins very much as does the simple tertian, with chill, sweat, and rise of temperature to 103°, 104°, 105°, or even higher (in one case a temperature of 107.5° was reached). The temperature commonly falls to normal the day following the chill and rises again on the third day, perhaps to a higher point than during the initial chill, and during this second paroxysm a mild delirium is very apt to occur. Following the second chill the temperature is apt to assume a remittent type with no marked variations, and frequently the temperature is of moderate degree, ranging from 102° to 103°. At this stage the patient begins to look ill and is extremely depressed mentally and physically.

In the bilious remittent form the attack frequently begins without a marked chill, with but a moderate rise of temperature to 103° to

103.5°, and with vomiting as an early symptom. On the second or third day a slight jaundice commonly appears. The fever is continuous with moderate remissions, abdominal pain and distention are often present, and the patient complains more of indigestion and abdominal discomfort than of other symptoms. This form of fever is often confused with a type of fever known locally as "intestinal fever," which appears to be either a malaria with gastro-intestinal symptoms or simply an intestinal autointoxication. Other severe and malignant types of malaria have not been encountered, but any case of subtertian infection may rapidly become grave unless diagnosis is made early and quinin treatment promptly instituted.

Some six or eight cases of "blackwater fever" have occurred among the personnel of the brigade, but only two of these cases were admitted to this hospital. No deaths have occurred from this disease, some of the cases recovering under quinin treatment, others without it. In one case the red count fell to 1,390,000 with hemoglobin of 40 per cent. This case on admission showed a red count of 3,000,000 with hemoglobin of 70 per cent; on the second day the count was 2,600,000 and on the third day 1,390,000, small tertian rings being present. This case was treated with very small doses of quinin (2½ grs. three times a day) and bicarbonate of soda and chlorid of calcium.

In the treatment of malaria the so-called "Panama" treatment has been followed in all cases in which quinin could be given by mouth, except in those cases in which the symptoms were of a very severe type. In the average case, following a calomel purge, 15 grains of quinin sulphate in capsules would be given three times a day for one week, then 10 grains three times a day for one week, and then 5 grains three times a day for one week. In cases in which quinin could not be taken by mouth and those presenting severe symptoms, 15 or 20 grains of quinin hydrochlorosulphate would be given intramuscularly without delay. As a rule, one intramuscular injection would suffice to control the symptoms, and then the routine treatment would be followed. In some cases as many as three injections have been given in a day. In a few cases in which the temperature would not yield to quinin by mouth or intramuscularly, intravenous injections have been given. In such cases the dose has been 10 or 15 grains in 200 or 300 milliliters of normal salt solution. The effects of the intravenous administration of quinin have in some cases been very striking. In a number of cases in which 45 grains or more were being given by mouth daily, and in which, although the patients were cinchonized, a moderate temperature persisted, the administration of 10 or 15 grains intravenously would cause the temperature to disappear almost immediately and the patients would enter upon satisfactory convalescence. In most cases the intravenous administration of quinin was followed by a decided reaction consisting of a chill, a rise of temperature, and marked depression. In one case, that of a patient much debilitated, the administration of 15 grains of quinin was followed by profound collapse and very slow recovery. In the opinion of the writer, as large a dose as 15 grains of quinin should not be administered intravenously to a weakened patient. We have seen no serious symptoms follow the administration of as much as 10 grains.

Quinin prophylaxis has not proven effective. While it is true that 5 or 10 grains of quinin daily will hold the symptoms in abeyance, it will not in such doses prevent infection. We have seen infection occur in a patient who had been taking 5 grains of quinin three times each day for several months and was taking this amount when symptoms developed.

It seems true that in patients who have taken quinin for long periods as a prophylactic, the parasite, when infection does occur, is much more resistant to the effects of quinin than in an individual who has not taken quinin previous to his infection. It is in such cases that the intravenous administration of quinin is so often necessary to control the fever and eliminate the parasite.

As above noted, syphilis has been the second most important disease as a cause of disability. For syphilis, there have been 157 admissions, with a total of 3,625 sick days. Venereal prophylaxis has been carried out systematically, but does not appear to have produced any great effect in reducing the amount of infection. Syphilis is perhaps the most prevalent disease in Haiti, and unquestionably a very large proportion of the population is infected. Disfigurement from this disease is frequently seen among the poor, even in the streets of the city, the loss of the nose or mouth being perhaps the commonest form this mutilation takes. Cases of syphilis have in some instances proven of unusual severity. Very early cerebral involvement has been noted several times, a condition characterized by stupor and frequently by convulsions. The majority of these cases yielded to active treatment by salvarsan and mercury, but it has been necessary to invalid from the service one or two of these cases.

The absence of serious intestinal infection is remarkable. There have been several admissions for a severe bloody diarrhea, and perhaps in some instances the trouble may have been a form of bacillary dysentery, but the laboratory facilities have been too limited to demonstrate the exact nature of the infection. All of these cases have yielded very promptly to repeated small doses of salines with a restricted diet.

The following cases are considered of sufficient interest to report:

Case No. 1—Liver abscess.—A. D., M. Att. 3cl, U. S. N., was admitted from the U. S. S. *Prairie* on February 25, 1916. Examination showed a marked tenderness and some rigidity in the upper right quadrant of the abdomen and slight enlargement of the liver. There was a marked leukocytosis, and a blood smear showed subtertian parasites. For several days after admission quinin was given in large doses, but without benefit, and the leukocytosis persisted.

March 4, 1916, operation, right rectus incision above the umbilicus. A mass the size of an orange was found protruding from the anterior surface of the liver near the lower border. This mass was gently broken into and a large amount of pus evacuated. The abscess and pus had the appearance of an ordinary pyogenic infection. A stab wound was made to the right of the rectus over the abscess cavity and a tube and gauze drain inserted therein. The rectus incision was closed with a small drain at its lower angle. The patient made an absolutely uneventful recovery, and was discharged to duty April 16, 1916.

Case No. 2—Tetanus.—J. R. W., Corp., U. S. M. C., while standing on the second-floor balcony of the provost marshal's building in Port au Prince, defending it, was shot through the right foot, the ball passing through the floor of the balcony, through the foot from below, carrying away the articular surfaces of the second and third metatarsals and emerging about an inch and a half posterior to the cleft between the toes. The wound was cleaned with an antiseptic, fragments of wood, leather, and lead removed therefrom, and then disinfected with iodin and a drain inserted. The injury occurred on January 5, 1916. On January 13, 1916, the patient complained that his jaws were stiff and that he could not open his mouth fully. Examination showed that the teeth could be separated for not more than half an inch. Under chloroform the wound was opend, thoroughly cleansed, and 3,000 units of tetanus antitoxin given intravenously.

January 14, wound redressed under chloroform, swabbed with pure phenol, and 5 ampules tetanus antitoxin (dry) given subcutaneously.

January 15, wound redressed as before. Five ampules antitoxin (dry) injected subcutaneously; jaws are set, teeth can not be separated, abdomen and body boardlike, muscular twitchings. On this date the Baccelli phenol treatment was begun, giving 1 milliliter of 3 per cent phenol intramuscularly every two hours.

January 16, general muscular rigidity and slight convulsions with difficult respiration. Four tubes dry antitoxin were given. Phenol solution continued.

January 17, the strength of the phenol solution was increased to 6 per cent and 3,000 units of liquid antitoxin given intravenously and two tubes of the dry subcutaneously.

January 18, condition about the same; swallowing difficult; 3,000 units antitoxin intravenously at 10 a. m. and at 8 p. m. Chloral and potassium bromid as necessary. Received 5 grains of phenol in 24 hours.

January 19, no change. Seven grains phenol administered intramuscularly and two tubes of the dry antitoxin subcutaneously. Rigidity of the muscles of abdomen and body continues, jaws slightly relaxed, mouth can be opened half an inch.

January 20, 7 grains of phenol intramuscularly, two tubes of antitoxin (dry) subcutaneously. Condition shows a slight improvement.

From this time the improvement was satisfactory and uninterrupted. The antitoxin and phenol treatment was continued until January 29, in decreasing doses. The patient was discharged to duty February 29, 1916, having completely recovered with the wound entirely healed.

Case No. 3—Comminuted gunshot fracture left humerus.—J. D. G., Corp., U. S. M. C., was shot on the streets of Port au Prince on May 30, 1916, the bullet entering the middle third of the outer surface of the left arm and emerging internally, producing a wound of exit as large as the palm of the hand. The ball passed through the humerus, extensively comminuting it and carrying away an inch or more of the bone. No large blood vessels or nerves were injured. After passing through the left arm the bullet hit and was deflected by a tin tobacco pouch in the left breast pocket and then inflicted a superficial wound of the anterior surface of the right arm. Under chloroform the wounds were disinfected with iodin, two drainage tubes were inserted into the wound of the left arm so as to produce through and through drainage, and coaptation splints were applied to retain the fracture. A fenestrated plaster-of-Paris cast with shoulder cap was applied as soon as conditions permitted.

In this case all wounds healed without infection and firm union was obtained in the left humerus with about an inch shortening.

In a letter recently received from this patient he stated that he had already recovered very good use of his arm and hoped that eventually it would be as good as ever.

I do not feel that I can close this report without commenting upon the very good and faithful work done by the members of the Hospital Corps of the Navy serving with the expeditionary force. This work has been of a most arduous and trying nature. In several instances hospital stewards and apprentices at isolated posts have had to perform the duties of a medical officer and did so very acceptably. At one station a hospital apprentice, first class, efficiently amputated a leg.

REPORT OF OPERATIONS OF THE MEDICAL DEPARTMENT PARTICIPATING IN THE OCCUPATION OF SANTIAGO, SANTO DOMINGO.[1]

By F. L. Benton, Surgeon, United States Navy.

The medical detachment attached to the Fourth Regiment, United States Marines, landed peacefully from the U. S. S. *Hancock* on June 21, 1916, and went into camp at Monte Cristi, Dominican Republic. The marines and Hospital Corps went into camp under shelter tents. The fort commanding the city was occupied until June 26, when the march to Santiago was begun.

At Monte Cristi an infirmary was opened, and during the period between June 21 and 26 all effort was directed toward eliminating ineffectives and toward selecting an adequate medical equipment from the list of medical stores at the base. The distance to Santiago was about 85 miles. It was known that the road was bad in part and that bridges had been destroyed. It was therefore necessary to select and carry only such supplies as were essential to secure efficient work, particularly since there was great difficulty in securing adequate transportation. This scarcity of transportation is indicated by the necessity of reducing the medical department's allowance from three carts to one. In this one mule cart, which headed the mule train and which had a carrying capacity of 800 pounds, were carried the personal equipments of 1 medical officer and 16 members of the Hospital Corps. The officers were allowed 50 pounds of personal baggage, the hospital corpsmen 16 pounds. Also on this cart were carried eight buckets, an improvised detached service chest, one each of boat expeditionary medical and surgical chests, a box of serum, can of kerosene, one Army litter, and one hospital tent fly.

Attached to the medical department was one automobile ambulance. Fastened securely to the ambulance were eight lanterns and one large water can. Attached to the rear of the ambulance was one United States Marine Corps pushcart, in which was carried the following equipment:

(1) 1 each United States Navy boat expeditionary medical and surgical case.
(2) Dressing roll.
(3) Tin of sterile water for surgical dressings.
(4) 2 tins drinking water.
(5) 12 tins chloroform, 12 rolls cotton, 12 rolls gauze.
(6) Tincture of iodin, 1 gallon.

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[1] Extracted from official report to the Bureau of Medicine and Surgery.

The personal medical equipment of the medical officers consisted of a bandolier containing in one pocket an instant rubber tourniquet, a bottle of iodin solution, Magendie and strychnin solution, and three extra first-aid packets. These bandoliers were constantly in use and are invaluable on an expedition ashore.

The personal equipment of the hospital corpsman consisted of a Hospital Corps pouch carried by himself, also a bandolier with the instant rubber tourniquet, iodin solution, foot powder and plaster, and three extra first-aid packets. Later the Hospital Corps pouch was carried on the medical department mule cart and used at the end of the march, when the companies were encamped, by the hospital corpsmen attached to their respective companies.

Each medical officer was attached to a battalion and marched and camped with it. Each hospital corpsman was attached to a company for rations. He marched and went into action with it. By this organization each medical officer had four corpsmen, each with a litter and equipped, under his direction. A company going on outpost duty would automatically have its equipped hospital corpsman along.

For advance guard duty the leading battalions would take their turns, similarly the medical officers and hospital corpsmen would follow.

The expeditionary force left Monte Cristi on June 26 at 6.30 a. m., and marched 25 kilometers the first day. The force consisted of the following: 33 marine officers, 809 men, 4 medical officers, 16 hospital corpsmen.

At Navarrete station the force was increased by 4 marine officers, 1 medical officer, and 250 marines, the force arriving at Santiago with 1,000. There were 250 left at the base in Monte Cristi and 150 at Puerto Plata.

At kilometer 25 the revolutionists were strongly entrenched at La Trenchera. The column attacked with artillery, and later the position was carried with the loss of one marine killed (Pvt. J. J. Awkerman, Twenty-seventh Company) and five wounded. The medical officers and hospital corpsmen all performed their duty with credit under fire, attending the wounded, and accompanying their organizations into action. A dressing station was here established, from which the dead and wounded were transported at once to the *Solace*[1] at Monte Cristi. As a routine measure all wounded received antitetanic serum.

The march was continued the day following. There was frequent firing on the column along the road from the bush and trees. There was a scarcity of water along the line of march due to the winding course of the Yaque, which frequently was as much as 6 miles from the camp site. This scarcity was well borne by the column, and was handled by sending the string of automobiles to secure water from a distance.

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[1] See p. 29.

On July 2 the column camped for two days, while arrangements were made to cut from the base at Monte Cristi. The force was then able to bathe in the Yaque, and the rest was of material benefit to all. There was a good proportion of foot soreness. These cases were all treated at the ambulance at the evening camp. It is known that but few remedies are required for a marching column. Laxatives, intestinal astringents, and antipyretics are essential. The constant demand for quinin by the troops was generally refused. In fact, all quinin was collected, and only dispensed by a medical officer's order. Cases of malaria appearing, all responded to quinin sulphate 10 grains t. i. d., and repeated for six weeks at the end of a week.

Regarding water supply on the march—it should always be boiled; but, with troops on edge for want of water in a hostile region, there was never a time when a man would not take his chance to draw fire if at the same time he can draw water of any sort. Fortunately the country was not densely populated. The Yaque is a swift and broad stream, typhoid fever is not prevalent, and the farther the troops advanced into the interior the less the danger appeared to be from water-borne diseases.

The care of the feet of the troops required constant vigilance. A man will usually walk until he has large blisters on his feet rather than ride in the ambulance or on the transportation wagons or carts. Such cases were generally soon located by the hospital corpsman attached to the company.

The proper use of foot powder, iodin, and plaster by the hospital corpsmen has prevented the necessity of carrying many who otherwise would have required transportation.

On July 3, at La Barrancita Seccion al Guayacanes, the strongest resistance was made to the advance of the column. Here one marine was killed, Corp. G. Frazee, Twenty-eighth Company, and nine were wounded. The majority of those wounded were sent back to the *Solace*, the slightly wounded carried on with the column. Pvt. K. Milles, Thirty-first Company, was killed on June 30 at about kilometer 58. The column was attacked at night while encamped at kilometer 42; fortunately none was injured, though the fire was very active.

The column arrived in front of Santiago on July 6 and entered peacefully at 3 p. m., according to an agreement entered into by the peace commission from the city and the commanding officer.

I can not but use this opportunity to express my appreciation for the good work done by the medical officers and hospital corpsmen who were with the column. The medical officers and hospital corpsmen all accompanied their organizations into action, attending the wounded and carrying them to a place of safety while under an active fire.

WITH MARINES IN SANTO DOMINGO.

By K. C. MELHORN, Passed Assistant Surgeon, United States Navy.

In June, 1916, the Fourth Regiment, United States Marines, was rushed from its barracks at San Diego, Cal., to assist in quelling Santo Domingo's latest revolution. The movement of these troops proved to be the most extensive that has occurred in the Marine Corps since the Boxer uprising in 1899.

Telegraphic orders were received at 8 a. m., June 4, and the command was reported ready for entraining 12 hours later. But owing to the inability of the railroad to supply coaches the regiment was unable to leave San Diego until the evening of June 6. Two troop trains of 10 cars each and 1 freight section were employed, each train carrying mess and kitchen cars (converted baggage coaches), tourist sleepers for enlisted men, and standard Pullmans for officers. Emergency medical chests were provided and the hospital corpsmen apportioned accordingly.

It was no small satisfaction to be able to report the medical stores ready for loading within five minutes after receipt of orders, thanks to the recent system as detailed in the Field Supply Table. For stowage, ease in handling, recognition of boxes, crates, etc., the new regimental and field hospital equipment presents a great stride forward, and no one appreciates this more than quartermasters.

Included among our supplies were 750,000 units of antitetanic serum. This had been requisitioned two months before by the fleet surgeon (Pacific Fleet) and transferred in a special ice box to our storeroom. Within two weeks it was in use, all of the casualties (excepting the instantly killed) receiving prophylactic injections at the dressing stations a few minutes after being struck.

On June 10 the command embarked aboard the U. S. S. *Hancock* at New Orleans, where additional medical officers and hospital corpsmen reported for duty. Here an opportunity was taken to secure a large amount of emetin, and it proved a valuable asset. On request the regimental quartermaster added to his supplies 10 barrels of crude petroleum—most useful for latrine and incinerator work.

A previous recommendation that all officers and enlisted men of the regiment wear identification tags at all times not yet having been acted upon, an attempt was made to complete them now. Under the supervision of a hospital corpsman six men, working 2 dies 10 hours a day, finally completed and distributed 786 tags in 4 days.

This gives some idea how slow and tedious the procedure is and why it should be performed at the home stations.

The regiment disembarked at Monte Cristi June 22 and went into camp on a hill overlooking the town. Here we learned that the plan of campaign included an 85-mile march into the interior of the country where revolutionists were reported operating. The problem of transporting supplies for such a distance was solved within three days by the rental and purchase of 12 motor cars, 7 trucks, 1 tractor, 15 two-wheeled ox carts, 1 water wagon, 20 horses, 10 mules, and 40 burros. One of the light motor cars, of a delivery-wagon type, was assigned to the medical department for use as an ambulance. To this was attached red cross guidons and a large water can. Its capacity was three patients reclining or five sitting. To the rear of the car was attached, as a trailer, a barrack pushcart in which were carried one expeditionary case (medical and surgical) and the personal equipment of patients picked up *en route*.

There was also assigned to our department one 2-wheeled cart with three mules. Its reputed capacity was 1,000 pounds, but we soon saw that it would do well to stand 800 pounds. As the total weight of the regimental hospital equipment is 1,738 pounds, and the command was under orders to move the following day, a quick decision had to be made as to what to take along and what to leave at the base. After several experiments in loading and unloading the following were selected as the cart's allotment: 1 battalion and 6 company units, 2 reserve dressing rolls, emergency case (United States Army No. 824), emergency chest, tent fly, 16 hospital-corps blanket rolls, 10 buckets, and 6 lanterns. The question of a driver for our none-too-friendly mules was solved by a hospital corpsman, who proved to the manner born. March orders assigned this cart to No. 1 position in the combat train and never but once (when the center mule collapsed) did it fail to keep its place in the column.

At varying distances, but averaging about 2 miles away, a swiftly flowing mountain stream, the Yaque, paralleled our line of march. From this abundant supply motor trucks and cars were used to transport water to the troops *en route*. During the first day's march, when 25 kilometers were covered, the demand for water was very great. On two occasions that day, when water wagons were delayed, men were observed drinking from roadside pools. They were, of course, promptly stopped, but the harm if any had been accomplished (about five cases of amebic dysentery reported for treatment later). For our expeditionary forces there is a great need of water sterilizing bags such as described by Maj. William J. Lyster, Medical Corps, United States Army, in the *Military Surgeon*, March, 1915.

They are light, easily transported, and for this reason are particularly applicable to marine and ship detachments operating ashore.

One thing is certain—that where troops must operate quickly in a country where good roads are *nil* and where transportation must be confined to pack animals—Forbes sterilizers and Darnall filters (excellent in permanent or semipermanent camps) are entirely too heavy and cumbersome. They simply can not be used. To quote Maj. Lyster the sterilizing bag is:

1. A convenient method of sterilizing water of 100 per cent bacterial efficiency.
2. A portable appliance, light enough to be carried constantly in the field on the back of one man in lieu of other transportation.
3. Available without renewal for 10 or 12 days.
4. Prompt service.
5. Water not raised in temperature.
6. Supervision of the filling of the canteens.
7. Disinfection of the canteen.

Just as the column was getting under way at Monte Cristi on the morning of June 26 the hospital ship *Solace* hove in sight and came to anchor in the bay. The mere knowledge of her presence produced a most comforting feeling in all hands, and I am sure added materially to the general morale of the whole command.

The companies being greatly under strength, it was impossible to secure the regulation number of litter bearers. But the organization of the medical department followed the Field Service Regulations as closely as circumstances would permit:

To Headquarters Battalion (including field hospital, ambulance, and supply train): Two medical officers and six hospital corpsmen.

To First Battalion: One medical officer and five hospital corpsmen.

To Second Battalion: One medical office rand five hospital corpsmen.

To troops for duty at the base (two companies at Monte Cristi): Three hospital corpsmen.

These details remained with their respective units throughout the march, participating in three engagements against intrenched rebels.

The total number of casualties—3 killed and 23 wounded—was due in great measure to the poor aim of the Dominicans, for their volume of fire under the stimulus of native rum was often intense enough to have inflicted far more damage.

With but few exceptions the first-aid dressings were promptly and ably applied at the firing lines by the hospital corpsmen, who had to be frequently cautioned against unduly exposing themselves. As a part of his regular equipment each apprentice, hospital steward, and medical officer carried a bandolier containing 5 extra first-aid packages, 25 mils of iodin, 6 cotton applicators, and 100 grams of foot ease. After the first engagement burros were secured to carry extra litters and pouches for each battalion. Until July 3 the dead, injured, and sick were transferred to the *Solace* by autos. On that date the command severed connections with its base at Monte Cristi and continued on toward Santiago. The third and last encounter with the revolutionists occurred at Guayacanes July 3, our loss being 1 killed and 12 wounded; the rebels, about 30 killed and an unknown number wounded. Our injured were transported by ambulance and motor trucks to Navarette, arriving there July 4. From this point they were forwarded by rail and boat to the *Solace*, another column of marines having opened up the railroad to Puerto Plata.

On July 5 the regiment completed its tenth day's hike with a peaceful entry into Santiago, the revolutionists abandoning their strongholds there.

Among the many lessons learned on this interesting march the following stand foremost in the writer's memory:

1. Medical officers and hospital corpsmen on expeditionary duty should thoroughly familiarize themselves with the Field Supply Table. Ignorance of what the outfit contains and where articles may be found will lead to utter confusion.

2. While the forces are *en route* to the port of disembarking a careful study of the books pertaining to field service (in regimental book box) should be made—a "brushing up," as it were.

3. A medical officer should always be present when medical stores are being loaded and unloaded. He can always be of service in advising the ship's officers and the quartermaster as to how best to handle these supplies and see where the fault lies when carelessness occurs. But, most important of all, he knows exactly where and how his stores are going.

4. Company and battalion units should always be so stowed that they are easily procured for emergency.

5. The detailing of one medical officer to act solely as a sanitary inspector. He should be given complete charge of this matter and should be made responsible only to the chief surgeon and commander of the forces.

6. The supplying of bags and calcium hypochlorite for the sterilization of water, such as are now being used by the United States Army.

A REVIEW OF THE TREATMENT AND RESULTS AT THE UNITED STATES NAVAL SANATORIUM FOR TUBERCULOSIS AT LAS ANIMAS, COLO.[1]

By G. H. Barber, Medical Inspector, United States Navy.

The tables appended, marked "A" and "B," respectively, show the number of all classes of patients and their disposition during the cal-

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[1] From Annual Sanitary Report, Jan. 1, 1916.

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endar year 1915, and enables a comparison to be made of the work done by years since 1911.

The table marked "A" includes only tuberculosis cases and is the original of the report forwarded annually to the National Association for the Study and Prevention of Tuberculosis, and is made up according to the classification adopted in 1913. It will be noted that two new classes have been added, viz, "quiescent" and "apparently arrested." The conditions which must exist at time of discharge have been changed as follows:

1. Dead.
2. Unimproved. All essential signs and symptoms unabated or increased.
3. Improved. Constitutional symptoms lessened or entirely absent; physical signs improved or unchanged; cough and expectoration with bacilli usually present.
4. Quiescent. Absence of all constitutional symptoms; expectoration with bacilli may or may not be present; physical signs stationary or retrogressive; the former condition to have existed for at least two months.
5. Apparently arrested. Absence of all constitutional symptoms and expectoration with bacilli absent for a period of three months; the physical signs to be those of a healed lesion.
6. Arrested. All constitutional symptoms and expectoration with bacilli absent for a period of six months; the physical signs to be those of a healed lesion.
7. Apparently cured. All constitutional symptoms and expectoration with bacilli absent for a period of two years under ordinary conditions of life.

It will be noted that, owing to conditions pertaining to continuous residence prevailing at public sanatoriums, their physicians no longer speak of cases as cured, and, in this institution at least, it will but rarely happen that a case will be reported as apparently cured owing to the time limitations and the inability to follow up cases after discharge. The classification of patients for both admission and discharge for the year have been made by one medical officer in the endeavor to eliminate unavoidable errors due to frequent changes among assistants as noted in last year's report. Another year of this practice will make this table more useful for comparison with similar reports from other sanatoriums.

The table marked "B" includes admissions and discharges of all classes of cases, nontuberculous as well as tuberculous.

The total number of all cases treated during the year was 530—an increase of 78 over 1914, of which 217 remained from last year; 313 were admitted; 306 discharged; and 224 were continued to next year. In executing the bureau's order of September 17, 1915, it became necessary to discharge 17 patients whose disease was "not in line of duty," the majority of whom left the hospital, not wishing to remain as supernumeraries. Of the admissions, 6.3 per cent had concurrent syphilis. The number of deaths during the year was 36—a decrease of 8 as compared with 1914. Of these, 1 first-stage case died with laryngeal tuberculosis, with 747 sick days. Of the second-stage cases there were 9 deaths; 2 after less than 6 months' treatment; 3 less than one year; and 3 more than one year. Of the third-stage cases there were 26 deaths; 6 after less than two weeks' treatment; 2 less than one month; 4 less than two months; 5 less than six months; 5 less than one year; and 4 after more than one year's treatment. Of the eight deaths occurring after a residence of less than one month all but one were received from hospitals and were on the active list of the service.

There were six cases admitted during the year as with tuberculosis and the diagnoses subsequently changed to a nontubercular disease.

During the past year the treatment of cases has been confined to a continuation of Patterson's graded rest and labor as a routine measure for all cases whose physical condition rendered the method applicable. A considerable number of second and third stage cases were to be found in the fifth and sixth labor grades and working about the reservation for four hours daily. The patients in the sixth labor grade are detailed for any work that may come up, and in case of emergency the time is extended beyond the routine four-hour period. The same gratifying results have followed the use of this method as have been noted in previous reports.

Heliotherapy.—Four concrete platforms were laid, connected by walks of the same material, between the east veranda of the surgical ward and the main infirmary building, and four hospital tents have been in use there for a greater part of a year. Excellent results have been obtained in all surgical cases involving bones and joints.

The Minin current—ultra-violet rays.—This method has been continued during the year. While there have not been as many sinus and gland cases as in 1914, the results obtained seem to leave no doubt as to the decided benefits resulting from its use.

Inhalation treatment.—In the sanitary reports for both 1913 and 1914 an outline was given of a method of treatment by inhalations. As the result of our observations of the results obtained with a limited number of patients during 1913 and 1914 the method has become a part of the routine treatment for all patients during the past year. With the exception of the statistical claims, I believe the method to be all that its author claims for it and the results obtained fully warrant all the trouble and expense incident to the installation of the apparatus and using it as part of our routine treatment. For reasons stated above, as well as in the 1914 report, in commenting on our statistical table, no attempt has been made to represent the results of the treatment by means of a table. The class of patients under treatment here renders the task of administering a treatment of this nature a difficult one, and in some cases it is impossible to carry out successfully. An interesting feature in connection with this treatment and one which seems worthy of note has been brought out from the sputum examinations: Of the 67 cases which were discharged during the year as first-stage cases, 28, or 40.9 per cent, were negative for tubercle bacillus on admission and remained so on discharge; 20 cases, or 29.8 per cent, were positive on admission and negative on discharge. Of the 88 cases discharged during the year as second-stage cases, 22, or 25 per cent, were negative on admission and remained so on discharge; 13, or 14.7 per cent, were positive on admission and negative on discharge. Of the 46 cases discharged during the year as third-stage cases, 3, or 6.5 per cent, were negative on admission and remained so on discharge; 2, or 4.3 per cent, were positive on admission and negative on discharge.

Each negative sputum report indicates three negative examinations on successive days, the last one being an antiformin.

In each sputum examination made during the year note has been made of the form and staining characteristics of the bacilli present. In practically all cases that have been discharged as "improved" or better, and where the original note has indicated the presence of the short, grouped, solidly stained, virulent type of bacillus, on discharge there was noted the presence of the long, thin, beaded, imperfectly stained, attenuated type. It is understood that the virulence of the bacilli is largely a relative matter, and, in a measure, is modified by the body resistance. Then the ultimate effects must be measured by the inherent resisting power of the individual.

Of the 224 patients in the hospital on December 31, 1915, 57 were in the infirmary. Of this number, 13 were in the north wing, where they remain two weeks after admission, regardless of their physical condition, which leaves 44 second and third stage cases whose condition necessitates infirmary treatment. The balance were in one of the convalescent wards and in one of the six working grades.

TABLE A.—*Statistical summary of the treatment and results at the United States Naval Sanatorium for Tuberculosis, Las Animas, Colo.*

	Classification.						Total, by divisions.	
	Incipients.		Moderately advanced.		Far advanced.			
Remaining from last year	66		149		16		231	
Readmitted from other places	65		48		86		199	
Original admissions from Las Animas	1						1	
Discharged during year	68		90		49		207	
Continued to next year	64		107		53		224	
	Number.	Days.	Number.	Days.	Number.	Days.	Number.	Days.
Dead	1	747	9	2,713	26	5,878	36	9,338
Unimproved	10	2,157	31	12,281	16	2,966	57	17,404
Improved	9	4,337	17	7,172	4	622	30	12,131
Quiescent	17	5,522	17	9,375	3	2,086	37	16,983
Apparently arrested	13	3,599	2	1,157			15	4,756
Arrested	10	5,081	10	5,122			20	10,203
Apparently cured	3	2,604	3	2,356			6	4,960
Diagnosis changed to nontubercular disease	5	679	1	209			6	888
Continued to next year	64	23,840	107	36,132	53	13,177	224	73,149
Total for above	132	48,566	197	76,517	102	24,729	431	149,812

No cases of acute military tuberculosis during the year.

Total sick days of cases continued to 1916	73,149
Total sick days of cases discharged during 1915	76,663

TABLE B.—*A review of the treatment and results at the United States Naval Sanatorium for Tuberculosis, Las Animas, Colo., during the years 1911 to 1915, inclusive.*

1911.—215 admissions.

213 discharges, with total number sick days	52,100
146 cases continued to next year, with total number sick days	41,574
	93,674
Average number of sick days each case discharged	244.60
Average number of sick days each case retained	284.75
33 deaths, with average number of sick days each	246.06

1912.—182 admissions.

190 discharges, with total sick days	47,994
142 cases continued to next year, with sick days	44,138
	92,132
Average number sick days each case discharged	252.60
Average number sick days each case retained	310.83
26 deaths, with average number sick days each	194.03

1913.—225 admissions.

159 discharges, with total sick days	49,623
208 cases continued to next year, with sick days	53,533
	103,156

1913.—225 admissions—Continued.	
Average number sick days each case discharged	312.00
Average number sick days each case retained	235.73
22 deaths, with average number sick days each	236.81
1914.—244 admissions.	
221 discharges, with total number sick days	58,370
231 cases continued to next year, with sick days	70,576
	128,946
Average number sick days each case discharged	264.11
Average number sick days each case retained	305.52
43 deaths, with average number sick days each	191.11
1915.—200 admissions.	
207 discharges, with total number sick days	76,663
224 continued to next year, with total sick days	73,149
	149,812
Average number of sick days for each case discharged	370.30
Average number of sick days for each case retained	325.55
36 deaths, with average sick days each	259.40

SANITARY NOTES FROM THE U. S. S. SARATOGA.[1]

By W. J. Zalesky, Passed Assistant Surgeon, United States Navy.

Early in February, 1915, this ship left Shanghai, China, for the Philippines, spending February, March, April, May, and part of June around Manila and Olongapo. During June she again returned to Shanghai and remained there until November, when she left for Japan, spending November and part of December visiting the ports of Kobe and Yokohama. During the entire year it will be seen that the ship has been in large oriental ports where tropical and epidemic diseases are prevalent. As far as practicable, every precaution for safeguarding the men from contracting diseases ashore has been taken, but, as overnight and 48-hour liberties have been allowed, the breaking out of sporadic cases of smallpox, chickenpox, dysentery, measles, and severe venereal infections was not unexpected. All of these diseases are endemic and epidemic in Chinese ports, and, considering the number of liberties with the comparatively small number of infected cases which developed on board, the showing is considered most satisfactory.

During the first part of January, 1915, while the ship was in Shanghai, and while smallpox was epidemic, the medical officer started vaccination of the entire ship's company, performing double vaccination and using two separate and distinct vaccines; one vaccine obtained from the Bureau of Science, Manila, the second vaccine obtained from the Shanghai Municipal Laboratory.

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[1] From Annual Sanitary Report, Jan. 1, 1916.

On January 12, 1915, one member of the engineer's force was admitted to the sick list as a smallpox suspect and immediately transferred, with all of his effects, to the Shanghai Municipal Isolation Hospital. The evaporating room, where he was stationed, was fumigated, along with all the bedding and clothing of all other men employed in this compartment. With the approval of the commanding officer, all shore liberty was stopped, and all communication with shore except that absolutely required was cut off. The following day a second member of the engineer's force was sent to the isolation hospital as a smallpox suspect. The diagnosis of smallpox in both cases was confirmed by the municipal health officer two days later. From this time on energetic measures of prevention were strongly enforced, and all suspected compartments were thoroughly scrubbed and fumigated. Likewise all members of the Hospital Corps, all prisoners, and all others who had come into contact with these men had their effects fumigated. Inspection of the crew for results of recent vaccination gave 62 positive takes and 421 negative cases. On January 19, 1915, revaccination of all the negative cases which had not a good recent scar, with double vaccine virus, was again performed; this totaled 285 cases. On January 23 the second case transferred to the hospital died. The first case was doing well, although he had a marked confluent type of the disease.

The following entry from the ship's medical journal of January 25, 1915, is noted:

"No new cases (or suspects) having developed during 13 days quarantine, it is highly probable that no focus of infection has been established on board this ship. Local epidemic is abating. Recommendation made to the commanding officer that crew be given liberty, but that all liberty expire at midnight. It has been fairly definitely established that the two cases of smallpox which occurred were contracted either in Chinese houses of prostitution (on Fearon and Yalu Road) or in local low-grade hotels. Also, it was recommended to the fleet surgeon that midnight liberty only be granted to all vessels of the United States Navy in this port, in order to make the liberty uniform, and an order to this effect was issued by the commander in chief. Before going on liberty the crew were fully instructed regarding the nature and virulence of the disease, the probable focus of infection ashore to be avoided, and the seriousness of the offense of liberty breaking at this time. Smallpox is endemic in this port and periodically epidemic. Although the recent epidemic did not reach alarming proportions in the number of cases, the virulence of the disease was striking, the mortality among Europeans averaging over 50 per cent. Many cases were hemorrhagic and practically all of the remainder were confluent. Both of our cases were confluent. The remaining case is probably going to recover, but convalescence is not yet established."

During the third quarter of this present year there were 7 cases of endamebic dysentery with 52 sick days, and during the fourth quarter there were 3 cases with 31 sick days. This number of cases of amebic dysentery is not at all unusual, considering that liberty men when ashore are bound to eat and drink infected food and water. The temptations of a craving appetite of a sailor break down all barriers of caution, and they invariably will take a chance. Fortunately all of these cases responded promptly to emetin, rest, and proper diet, and, as far as I am able to determine, left no sequelæ. The price of emetin has rapidly increased on account of the war, and for a short period in October this drug was not procurable in Shanghai. When emetin is administered early in a case of amebic dysentery its action is prompt, efficacious, and thorough, but where a case has been allowed to go along several days without emetin, and extensive involvement of the bowel has occurred, the disease is most stubborn to treatment and difficult to cure.

During the middle of December, while this ship was six days out of Yokohama and bound for Manila, a case of chickenpox developed in one of the bandsmen. The case was at once isolated in the brig compartment, all of his effects gathered, and the compartment where he was quartered was thoroughly scrubbed with soap and water, followed by bichlorid of mercury solution. The following day the ship reached Manila, and the case was shown to the quarantine officer, who pronounced it to be one of varioloid. Although all of the crew had been vaccinated in September, revaccination of the entire ship's company was insisted upon by the quarantine officer. While this vaccination was in progress the case in question was transferred to the United States Naval Hospital, Canacao. The ship was not quarantined and pratique was given three hours after arrival. The diagnosis of chickenpox was confirmed by the staff of the Canacao hospital. No other cases developed subsequently. This case was undoubtedly infected in Japan, as I saw many cases of this disease during our stay in those waters.

The venereal question is still one of the most important problems that confront naval medical officers on this station. About the only way to stop venereal disease is to stop liberty, and this method is not practicable. Men have been taught the dangers of prostitution, and the application and observance of preventive measures have been literally pounded into them; all with poor results. Moral persuasion is scoffed at, and even practical methods of application of prophylaxis fail, because these are not taken early enough to be really efficacious and beneficial. The customs and the mode of life in the

Far East, where the purchasing value of the dollar is doubled, coupled with the widespread venereal infection of the prostitutes, cause great injury to our service. The most plausible method to lessen the number of venereal cases is some form of punishment, and the most far-reaching punishment is loss of pay. In my opinion the stopping of men's pay while they are incapacitated from duty on account of venereal disease would have the following good results: Marked lessening of the present large number of these cases; would serve to make the men more cautious; would influence them to take greater interest in prophylactic measures, both moral and medicinal; would lessen the injury to the service, and, most important of all, would help to raise the physical standard of the succeeding generation and benefit our race.

In view of the frequent number of cases from our ships in Chinese ports requiring hospital treatment, it would appear advisable for our service to have a naval medical officer stationed at Shanghai on duty, for the purpose of taking care of such cases that require hospital treatment. Two methods of solving this problem are suggested:

(*a*) To rent a ward from the Harvard Medical School Hospital, Shanghai, or any other hospital where similar arrangements can be made, and to utilize this ward for the accommodation of all cases from the Yangtze River gunboats and other vessels of the United States Navy in this vicinity. This ward to be under the direct charge and control of a naval medical officer.

(*b*) The stationing of a hospital ship at Shanghai, or other ports along the Yangtze River if required, to act as a hospital for the fleet.

VENEREAL CONDITIONS AT MARE ISLAND.[1]

By C. N. Fiske, Surgeon, United States Navy.

The abolition by law of segregated districts, and the promised rigid suppressing of lodging houses misused for prostitution, which went into effect January 1, 1915, have apparently in no way influenced the incidence of venereal diseases nor their variety or virulence, so that in so far as this naval station is concerned the operation of the law is a failure. This does not signify necessarily that an earnest effort has not been made in Vallejo to send from town public women who scattered upon closing the segregated district, for most cases seem to come this last year, as doubtless in the immediately preceeding years, from San Francisco, where from newspaper report and casual comment of enlisted men the "Barbary Coast" district is still open. Street soliciting nevertheless is still common in Vallejo, and a nuisance in San Francisco.

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[1] From Annual Sanitary Report, Jan. 1, 1916.

Relative incidence of venereal diseases in 1914 and 1915.

	1914 (old law).	1915 (new law).
Venereal diseases:		
Chancroid	8	9
Gonorrhea	45	46
Syphilis	19	16
Persons taking prophylaxis	[1] 1,498	1,453

[1] Marine barracks only.

At the marine barracks 19 cases of venereal disease developed in spite of prophylaxis (in most cases taken too late), and 13 developed among the comparatively few who failed to take the treatments advised.

Attention is invited to the fact that while the admission rate of venereal diseases for the service at large steadily dropped from about 199 in 1909 to 143 in 1913, and rose to 163 per thousand in 1914, and that for enlisted marines dropped from 227 in 1911 to 182 in 1913, rising again to 245 in 1914, the admission rate for marines at this station is slightly under 47 per thousand and is consistently low from year to year. Without routine wholesale inspection medical officers are satisfied that there are few if any concealed cases. Cases among the small naval enlisted force of this station far exceed those of the nearly 700 marines.

Fully as much moral persuasion, so far as the medical officers are concerned, has been given the Navy men, electrical school, yard craft, radio station, band, etc., as the marines, and the only plausible explanation has been the lower pay of enlisted marines, who can less well afford fare to San Francisco and overnight expenses; facilities for remaining overnight in Vallejo, except for the Navy Y. M. C. A., are poor indeed; yet this explanation possesses little value when it is considered that for the six years, 1909 to 1914, marines (the lowest paid group) constantly had the highest venereal admission rate among all the occupational groups of the service except the fireroom force, and in 1914 were 25 per cent higher even than the firemen and coal passers.

At any rate, venereal disease is relatively uncommon among marines at this station, and as these men seem to visit Vallejo rather than San Francisco, the inference seems justified that there is comparatively less venereal disease in Vallejo than in most communities which marines visit on liberty.

Two anopheles mosquitoes for the first time known having been found by medical officers at the hospital in November, the problem of chronic malaria carriers at barracks and hospital was suggested by Passed Asst. Surg. E. O. J. Eytinge; at this time it was too late to prospect for breeding places, because the fall rains had just started. On November 10, out of 750 health records at marine barracks and naval prison there were found 31 in which were recorded history of malaria—6 prior to enlistment have exhibited no signs since enlistment, and 25 allege origin in the service without health record note of the disease prior to enlistment. The peripheral blood of all practicable, 27 out of 31, was carefully, and in some cases repeatedly, examined by Passed Asst. Surg. Longabaugh, who reported negative results throughout; therefore, short of splenic puncture, the question of malaria carriers here for the time being has been eliminated. Search for anopheles breeding places will be pursued this coming spring. One marine recruit developed malaria on this station and possibly was infected here, but I deem it very doubtful.

SANITARY NOTES FROM RECEIVING SHIP, NAVY YARD, NEW YORK.[1]

By T. W. Richards, Surgeon, United States Navy.

Officially this vessel (*Maine*) fulfills the dual rôle of receiving ship at New York and a vessel in commission in reserve. This distinction is carried out in the statistical returns of the medical department, but as the ship and all persons on board constitute a single sanitary unit, subject to the same environment, no real insight regarding matters pertaining to the health of the personnel is practicable if this artificial division is observed, and for the particular purpose of this report it will be disregarded. A separate sanitary report dealing only with the receiving ship will be submitted by the medical officer of that ship; the medical officer of the *Maine*, however, does the strictly professional duty for all hands as a matter of convenience.

As my duty at this station dates only from November 9, conclusions regarding health of the personnel for the year is necessarily based largely on the official records. In this connection it is important to note that the percentage of sick, computed in the usual manner, gives a very false impression of the actual prevalence of disease on board, for the total complement, estimated from the paymaster's rolls, is much larger than the real number of individuals actually present, as some 600 men on detached duty have their accounts here. Moreover, lack of facilities for care of the sick on board and due regard for the patients' welfare result in numerous transfers to hospital, so that actual conditions are more correctly shown by admission rates than by total sick days. Viewed in this light it must be said that the health of the crew has not been satisfactory, particularly during the winter months, due chiefly to excessive prevalence of diseases of the respiratory tract; of these tonsillitis easily occupies first place. Thus during the first and fourth quarters (the cold seasons) there were 206 cases of respiratory disease, including 116 of tonsillitis, as compared with 62 and 43, respectively, during the warmer months. The prevalence of epidemic sore throat, generally returned as acute follicular tonsillitis, is deserving of serious investigation, particularly from an etiological standpoint. During the fourth quarter the number of admissions (66) about equaled the total for all other nonvenereal diseases, exclusive of other respiratory affections. The incidence of this disease increases suddenly with the advent of cold weather and continues unabated until the warmer months of spring. For the past six weeks all cases of sore throat have been carefully isolated in a small quarantine building on the dock, treating them, in fact, exactly as though they were frankly contagious, but it does not appear that these efforts have materially influenced the incidence of cases. Doubtless a number of etiological factors are involved, and the severity of outbreaks depend upon their combined influence. Among these, climatic conditions, overcrowding—or even close association—and bad ventilation are most certainly concerned. Of the ordinary quarantinable diseases the following appear in the returns: Diphtheria, 1; chickenpox, 1; scarlet fever, 8; measles, 1; German measles, 3; and mumps, 14. The actual number was somewhat greater, as a certain percentage of suspects, transferred with "diagnosis undetermined" developed diseases of this class. The total, however, seems surprisingly small considering the frequency with which cases were freshly introduced; with the exception of mumps secondary cases were relatively few.

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[1] From Annual Sanitary Report, Jan. 1, 1916.

In considering the total damage from diseases alone, it is to be noted that 212 cases, exclusive of injuries, were transferred to hospital; for a cruising ship such numbers would indicate that almost one-fourth the entire complement spent some part of the year in hospital—a preposterous percentage.

If, as I believe, it is apparent from the morbidity returns that certain diseases have been too prevalent on board, the explanation is not far to seek, and may be summed up in the statement that no ship is a suitable *habitation* in cold weather, and this is particularly true of an old-type battleship with an excess complement composed largely of young recruits quite unaccustomed to ship life. Undoubtedly military necessity may at times so far outweigh sanitary considerations that a high sick rate must be frankly accepted as a matter of expediency. Under the conditions prevailing here the results shown above might be confidently anticipated, and the question to determine is simply whether the end justifies the means. In weighing the present situation an analysis of the total enlisted force actually utilizing the ship's living spaces will be of interest; using approximate figures—for the actual numbers constantly fluctuate—it appears that during December, 1915, the total averaged 1,040, divided up somewhat as follows:

Maine complement	180
Receiving-ship complement	110
Electrical class	285
Prisoners and special details	110
General detail	355
Total	1,040

From this it appear that the number on board averaged about 300 in excess of the vessel's normal complement. Evidently the members of the *Maine's* complement are in a totally different military status from any of the others, since the former are on board because they are necessary for the ship, while the latter utilize the vessel, as a matter of convenience and expediency, simply as a habitation. Whether or not this or some other ship is at present indispensable for this purpose is a question for others to decide, but there are certain aspects of the matter which appear pertinent to the medical officer. A receiving ship supplies, in part, the personnel of the fleet, and when sanitary conditions prevail such as those encountered here in winter it is not to be expected that the physical fitness of those supplied will attain its maximum; moreover, owing to lack of facilities for segregation, outbreaks of contagious disease unduly delay transfers, sometimes affecting large numbers.

Members of the electrical class leave the ship at 8 a. m. and remain in the classroom until 4 p. m. except during the noon hour, when they return to the ship for dinner. This requires four trips daily of about 1 mile each, and the consequent exposure during inclement weather results in a sick rate which is higher even than the ship's average; from a practical point of view this means loss of time and efficiency, if nothing more.

Should it at any time be determined that sanitary considerations may be given more weight and that an improvement in health conditions is desirable the remedy is not far to seek—namely, suitable barracks ashore for all men not actually required for the ship routine. So far as the electrical class is concerned I have no hesitation in recommending that this step be taken without delay, utilizing if practicable such excess facilities as may be available at the marine barracks. With this change the ship's combined complement would be reduced to normal proportions, and members of the electrical class would also be the gainers.

SANITARY NOTES FROM THE U. S. S. NEW YORK.[1]

By H. O. SHIFFERT, Surgeon, United States Navy.

On January 18, 1915, a coxswain was admitted to the sick list as with tonsillitis, acute follicular. Smears from his throat on January 21 and 22 were negative. A smear on January 23 was suspicious, a culture was made, and the case isolated and given antitoxin. He died on January 24, and the culture was found positive after his death. He was buried at sea.

All precautions were taken regarding segregation of contacts and suspects, throat cultures, disinfection, etc. The ship arrived at Guantanamo Bay, Cuba, on January 26 and was placed in quarantine. On January 27 a quarantine camp was established ashore with eight patients under observation. Among these there developed three mild cases of diphtheria, and two cases without clinical symptoms, the other three remaining clear of infection. Antitoxin was administered to all. No further cases developed on board, and the ship was released from quarantine on February 6 to proceed to Guancanayabo Bay for practice, leaving a medical officer and a hospital apprentice on duty with the camp. Returning to Guantanamo Bay on February 19 cultures were made and repeated from all throats in camp, and found negative. The camp was accordingly broken on February 22 and all men returned on board well.

The heating of the ship is effected through the supply ventilating system and is efficient. The amount of steam to the radiators in this system is controlled in the engine room, rather than at the numerous radiators throughout the ship. The dryness of the air, which is common to the indirect system of heating, is corrected by having a small jet of steam escape from the radiator to be taken up by the passing air. With this combined heating and ventilating system the advisability of having a cut-off in the louver of a pipe discharging into a passageway or into a large compartment is questioned. Too often a cut-off is found closed because the rush of air or dust coming through the pipe or an uncomfortable temperature has been annoying to some one. On an inspection below deck a number of louvers are always found closed and the efficiency of the ventilating system correspondingly diminished.

The quality and preparation of the food for the general mess has been entirely satisfactory. The meals were served in the manner common on board ship, which leaves much to be desired as regards cleanliness and the serving of the food while hot. Recently the supply officer of this ship has inaugurated a new system for serving the general mess, and it is believed that the method will eliminate many existing objectionable features. He proposes to follow in a way the caféteria system, and describes the operation of his plan as follows:

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[1] From Annual Sanitary Report, Jan. 1, 1916.

"For each substation (of about 100 men) two mess tables are provided, one for holding trays and dishes required for the meal and the other for the large receptacles containing the various articles of food to be served. They are so placed that a line of men, under the supervision of a competent petty officer in each mess, passes by the first table and each man assembles on a small tray the dishes required for the meal, then files by the food table, where a man is stationed at each pan to serve the contents. He is served with the articles in the ration which he wants, and goes to his regular table to eat the meal. Messmen set the table as formerly, placing knives, forks, spoons, sirup, and condiments thereon. The coffee, tea, or cocoa is also served there. It requires from five to eight minutes to issue the entire ration to 100 men, depending upon the number and nature of articles served. One ship's cook or baker is required at each substation to represent the commissary department directly and to dish out the main article of the ration carefully, and as many messmen as are needed to man each pan of food."

For the past several weeks 140 men have had their meals served in the manner above described. The plan worked out to the entire satisfaction of everyone concerned, and is evidently an improvement in the cleanliness of serving meals. As soon as the necessary trays and dishes are procured the entire mess will be served in this manner.

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